

TIN CUP LAKE ACCESS ENVIRONMENTAL ASSESSMENT

**Bitterroot National Forest
Darby Ranger District
Ravalli County, Montana**

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USDA Forest Service

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PURPOSE AND NEED FOR ACTION

INTRODUCTION

The Forest Service has prepared this Environmental Assessment (EA) to determine whether or not an Environmental Impact Statement is necessary for the proposed Tin Cup Lake Access project.

Overview

The Forest Service proposes to authorize Tin Cup County Water and/or Sewer District (TCCWSD) access to their dam facilities, with certain terms and conditions, so that TCCWSD may operate and maintain their dam, which is consistent with their responsibilities under federal dam safety laws and regulations and consistent with their rights and responsibilities under terms of their authorization.¹ The Forest Service would authorize up to two helicopter trips each spring within a specific timeframe to allow TCCWSD to operate and maintain their facility. This access authorization would be valid during the authorization of the special use permit.

The purpose and need for the project stems from Tin Cup County Water and/or Sewer District's existing rights and obligations to maintain Tin Cup Dam consistent with federal dam safety standards and other pertinent laws and regulations which also govern TCCWSD's use of their facilities and the protection of National Forest System lands.

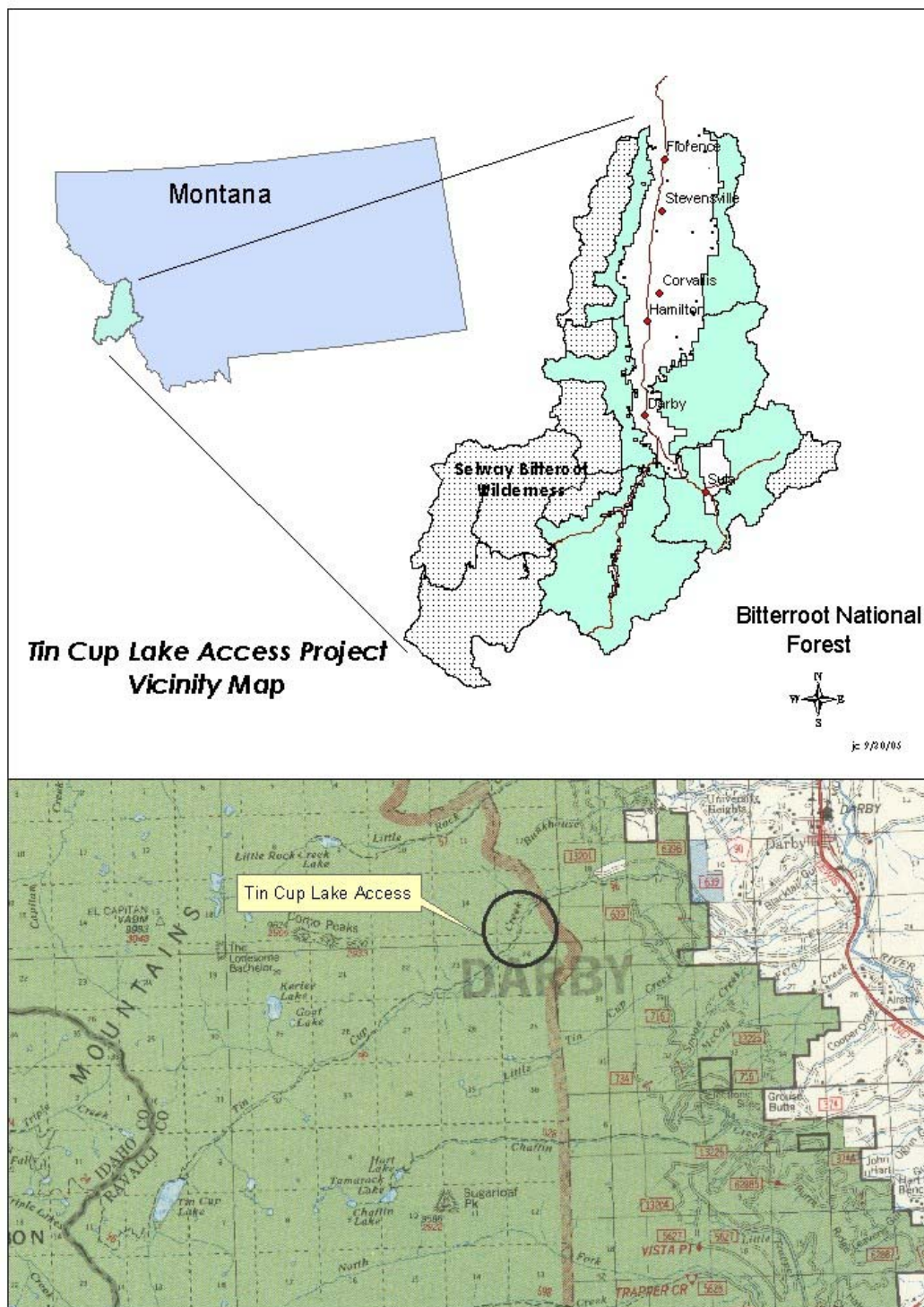
Tin Cup Dam is owned and operated by Tin Cup County Water and/or Sewer District (TCCWSD). TCCWSD has requested access to their facilities at Tin Cup Dam on the Bitterroot National Forest, Darby Ranger District, (see Map #1). The irrigation district has a valid occupancy to operate and maintain these dams on National Forest Lands under a special use authorization recognized under the Organic Act of 1896.

Tin Cup Dam is classified as a moderate hazard dam, and this classification is based on the potential consequences if the structure failed. Several residences and businesses are located within the dam breach inundation area, and therefore, a dam failure would likely result in excessive economic loss. The hazard classification is based on the potential results of a dam failure.

As the dam owner, TCCWSD is responsible for repairs, operation and maintenance of Tin Cup Dam. In early spring, difficult access conditions present hazards to TCCWSD personnel accessing the dam for operation and maintenance purposes. Please refer to Appendix D for TCCWSD's basis of their request to access the dam during this timeframe.

¹ Refer to Appendix A for a list of the authorities through which the U.S. Forest Service regulates dams on National Forest lands.

Tin Cup Dam Vicinity Map - Map #1



Background

The Tin Cup Lake Dam is located at the headwaters of Tin Cup Creek near the Montana–Idaho border, approximately 14 miles southwest of Darby, Montana. The dam is located in Township 2 North, Range 23 West, Section 1, Principle Meridian Montana, Ravalli County. The dam and lake are in the Selway-Bitterroot Wilderness of the Bitterroot National Forest. The Wilderness was established by Congress with the Wilderness Act of 1964. Access to the site is via Forest Service Trail #96.

The dam is located approximately ten miles southwest of the Tin Cup Creek Trailhead where the trail junctions with FS Road #639. The dam is about seven miles within the Selway-Bitterroot Wilderness (refer to Map #1).

This dam is currently classified as a moderate hazard dam and stores 911 acre-ft of water at the spillway crest. The dam dimensions are approximately 24 feet high and 484 feet long. Construction of Tin Cup Dam was authorized in 1906, and it was completed in 1915. Tin Cup Dam is owned and operated by the Tin Cup County Water and/or Sewer District.

PURPOSE AND NEED

The purpose of this proposal is to authorize TCCWSD adequate access² to their facilities and to prescribe terms and conditions related to this access and their subsequent work on the facilities as necessary to protect the National Forest.

The Forest Service is required by both the Wilderness Act³ and the Alaska National Interest Lands Conservation Act⁴ (ANILCA) to authorize access to valid occupancies such as this facility held by the TCCWSD.

In this case, the Wilderness Act also requires the Forest Service to “prescribe the routes of travel to and from the surrounded occupancies, the mode of travel, and other conditions reasonably necessary to preserve the National Forest Wilderness”. As such, the Forest Service has the responsibility to set reasonable terms and conditions on that access as necessary for protection of the National Forest.⁵

These acts prescribe a narrow scope to the Agency’s discretion, balanced between requirements to allow for the proponent’s rights and responsibilities pertaining to the use of their facility and the Agency’s responsibility to provide protections for National Forest and Wilderness values.

² Defined at FSM 2320.5.15 as “The combination of routes and modes of travel that the Forest Service has determined will have the least-lasting impact on the wilderness resource and, at the same time, will serve the reasonable purposes for which State or private land or right is held or used.”

³ Wilderness Act, Sec. 5(b); codified at 16 U.S.C § 1134; and the implementing regulations at 36 CFR 293.13 Access to Valid Occupancies.

⁴ ANILCA, Pub. L. 96-487, title XIII, Sec. 1323; codified at U.S.C. § 3210

⁵ Concomitantly, the Forest Service also has authority under its general grant from Congress to protect the National Forests (16 U.S.C. § 551) to regulate reasonably their occupancy and use in order to achieve the purposes for which the national forests were reserved, and the Selway-Bitterroot Wilderness was designated.

A number of factors help define and narrow the Agency's discretion in this case, and therefore they also define the scope and purpose of this proposal and are discussed further below.

TCCWSD has requested access during early spring when conditions along the trail are typically hazardous because of heavy snow pack conditions and potential for avalanche occurrences, or high stream flows causing difficult or treacherous conditions while crossing Tin Cup Creek on foot or stock. This alternative not only benefits the personal safety of TCCWSD representatives accessing the dam, but also benefits the long term safety and performance of the dam embankment and outlet works - which ultimately affects public health and safety of people and property located within the inundation zone downstream Tin Cup Dam.

There are several factors related to the safety of Tin Cup Lake Dam which influence the decision of TCCWSD to close their control gate in the spring. This operational strategy improves the overall condition of the dam by eliminating several elements that accelerate the deterioration of the dam. Closing the control gate in the spring also reduces the time of exposure or risk of dam failure by several months during the year, and therefore, provides a benefit related to protection of public health and safety.

Tin Cup County Water and/or Sewer District personnel have requested helicopter access for the last five consecutive years for the purpose of closing the headgate to the outlet works. Letters dated May 2 and September 4, 2005 were received from TCCWSD requesting helicopter access during the first two weeks of April 2006 to close the control gate at Tin Cup Dam. See the section entitled "Effects on Public Health and Safety" under "Key Topics" and Appendix D for the rationale for closing the headgate in the spring.

Authorization

Tin Cup Dam and Reservoir is currently authorized under a Special Use Permit that was issued on May 30, 2001 with an expiration date of December 31, 2021. The Tin Cup Water and Sewer District has applied in a timely manner to have the Tin Cup Dam and Reservoir recognized under the Act of October 27, 1986, P.L. 99-545; more commonly known as the Colorado Ditch Bill Easement Act. Tin Cup Dam and Reservoir qualifies for this easement and issuance of the easement is assured by federal legislation. As directed in the Act of October 27, 1986, the authorized officer has no discretion other than to issue a permanent easement to applicants who meet all the qualifying criteria that have been identified in the Act. Tin Cup Dam and Reservoir meets the qualifying criteria for easement issuance. Until the easement is issued and recorded the facility is being authorized under the terms and conditions of the current Special Use permit. Easement issuance is pending the settlement of a Quiet Title action being pursued in Federal Court at this time by the irrigators. At conclusion of the litigation an easement will be recognized under either P.L. 99-545 or the Act of 1866.

The Forest Service has reviewed the TCCWSD's preliminary request for access and has determined that:

1. Based on preliminary environmental review by the interdisciplinary team, it appears the irrigation district's proposed plans are, or could be made consistent with environmental laws.⁶ The interdisciplinary team developed the proposed terms and conditions based on this preliminary environmental review (p.9-10).
2. A minimum requirements process was used to assist with the analysis of TCCWSD's request.⁷ The process indicates the proposal would meet Forest Service Manual 2326.1 conditions under which use of motorized equipment and/or mechanical transport would be allowed within wilderness⁸ (Appendix B).

SCOPE OF THE PROPOSAL

The Tin Cup County Water and/or Sewer District has requested authorization for helicopter access to their facility at Tin Cup Dam for the last 5 consecutive years. TCCWSD requests this authorization so they may clear out the debris from around the intake to the outlet works prior to the reservoir overtopping the rock barrier and potentially drawing debris into the headgate. Completing adequate operation and maintenance of their dam is consistent with their responsibilities under dam safety laws and regulations and their responsibilities under their special use permit. This Forest Service proposal is limited to authorizing adequate modes and routes of access necessary for TCCWSD to perform their specified work and any reasonable conditions of access and operations necessary to protect the National Forest

It should be noted, in anticipation of these questions, that the Forest Service cannot decide for or direct TCCWSD to permanently breach the Tin Cup Dam. That decision lies solely with TCCWSD, as that decision affects their basic rights under their valid occupancy. Similarly, as described earlier, the Forest Service cannot deny TCCWSD reasonable access to their facilities as defined by existing law.

This EA tiers off the Final Environmental Impact Statement for the Revised Land and Revised Resource Management Plan for the Bitterroot National Forest and Selway Bitterroot Wilderness Direction and implements the management direction in the Plan.

Based on the analysis in this environmental assessment, the Forest Service will determine whether to prepare an environmental impact statement or a finding of no significant impact.

⁶ These include the Clean Air Act, Clean Water Act, Endangered Species Act, Historic Preservation Act, National Forest Management Act, etc.

⁷ The Minimum Requirement Decision Process was developed by federal agencies to help provide consistency to the way project proposals in wilderness are evaluated. This decision guide is a means to document the analysis process.

⁸ Forest Service Manual, 2326.1 – Conditions Under Which Use May Be Approved. Allow the use of motorized equipment or mechanical transport only for: 1. Emergencies where the situation involves an inescapable urgency and temporary need for speed beyond that available by primitive means. Categories include fire suppression, health and safety, law enforcement involving serious crime or fugitive pursuit, removal of deceased persons, and aircraft accident investigations. 4. Access to surrounded State and private lands and valid occupancies (FSM 2326.13). 5. To meet minimum needs for protection and administration of the area as wilderness, only as follows: b. An essential activity is impossible to accomplish by non-motorized means because of such factors as time or season limitations, safety, or other material restrictions.

PUBLIC INVOLVEMENT AND ISSUE IDENTIFICATION

On May 2 and September 4, 2005 letters were sent from TCCWSD requesting the use of a helicopter to close the control gate at Tin Cup dam during the first two weeks of April, 2006. Because of the on-going requests for helicopter access in early spring during hazardous access conditions along the trail accessing Tin Cup Dam, the Forest Service decided to complete an environmental assessment, rather than completing the required NEPA documents on an annual basis each spring. On October 4, 2005, the Forest Service received another letter from TCCWSD requesting that the Forest Service postpone the process for completing an environmental assessment until easement issues affecting dams in the Selway-Bitterroot Wilderness, including Tin Cup Dam, are resolved in court. TCCWSD believes the outcome of this current litigation process will resolve their outstanding easement issues which will likely affect access issues related to Tin Cup Dam. The Forest Service has decided to continue with the completion of the environmental assessment because of the unknown timeframe and potential delays associated with the pending litigation.

The following is a discussion of how the public responded to the proposed action, which the Forest used to help identify and develop potential issues.

PUBLIC INVOLVEMENT

A legal notice soliciting comments on the proposed Tin Cup Dam Project was published in the Ravalli Republic on November 3, 2005, marking the beginning of the 30 day scoping and comment period pursuant to 36 CFR 215. We also mailed a letter soliciting comment on the proposed action to 88 people potentially interested or affected by the proposal. The Tin Cup Dam Project was placed on the April 1, 2005 edition of the Bitterroot NEPA quarterly.

Thirteen responses were received as the result of the public involvement efforts during the thirty-day scoping period. All comments were evaluated and considered, and substantive comments relevant to environmental concerns were incorporated or addressed through analysis, mitigation or otherwise in this environmental assessment. Other comments are more appropriately addressed in the decision and other supporting documentation.

The Forest Service identified 3 key topics or issue themes raised during scoping and the 30 day comment period. These issues were: 1. dam safety and public safety, 2. questions, concerns and support surrounding adequate access and 3. the potential for adverse effects on wilderness character.

The Forest Service found no significant issues or significant unresolved conflicts that warranted detailed consideration of alternatives other than those identified in the scoping letter. Alternatives 1 through 5 address the issues brought forward by the public in their comments (also see "Other Alternatives Not Given Detailed Study" later in this document).

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This section describes the proposed action and alternatives. This section also discusses mitigation measures proposed to lessen the project's impacts.

ALTERNATIVE 1-NO ACTION

The No Action alternative is required by the National Environmental Protection Act (NEPA) and will serve as a baseline condition with which to compare other alternatives.

Under this alternative, the Tin Cup County Water and/or Sewer District personnel would continue to walk in to their dam or request helicopter access on a case by case basis each spring during difficult on-the-ground access conditions, which could delay the ability to close the headgate each spring in a timely manner. The concern is the timing to close the headgate before the reservoir level rises and overtops the rock barrier around the outlet works, which could draw debris into the headgate and trash-rack structure and render the headgate inoperable. The ability to open and close the headgate is required both for irrigation storage and release purposes, as well the ability to draw down the reservoir in emergency conditions.

ALTERNATIVE 2-NEW STREAM CROSSING

This alternative would consist of re-routing the trail and constructing a new stream crossing that is less hazardous than the existing crossing located in T3N, R22W, Section 24. Based on preliminary surveys this new stream crossing would require 1000 lineal feet of tread construction through difficult, boggy terrain and would also be located in Section 24. Numerous portions of the new access trail will require large amount of fill to eliminate the boggy wet conditions, piping in fills, ditching as well as tree clearing. In addition the construction of a new ford with a downstream structure (log or rock) will be needed as well as hardening the immediate approaches to either side of the new ford.

This alternative eliminates the first hazardous creek crossing for personnel and stock during early season use, but does not mitigate the second and third crossings or the potential avalanche hazards along sections of the trail further up the drainage.

ALTERNATIVE 3-PROPOSED ACTION

This alternative was developed to address the purpose and need for action.

This alternative was developed to authorize adequate, early season access to Tin Cup Dam to perform operation and maintenance activities on the dam while limiting effects to wilderness and other resources.

The Bitterroot National Forest proposes to authorize Tin Cup County Water and/or Sewer District helicopter access to operate and maintain their facilities at Tin Cup Dam. The Forest Service would authorize up to two helicopter trips within a limited timeframe in

early spring for the purpose of operating and maintaining Tin Cup Dam. The timeframe for helicopter flights would be limited from April 1 through May 15. Motorized access is anticipated to occur within a 1 to 2 day timeframe in early spring. The maximum flight time for 2 round trips would be approximately 1 hour. This flight time includes time over private and non-wilderness lands. Operation and maintenance activities include closing the headgate to provide for irrigation storage, clearing logs and debris from around the intake to the outlet works, and monitoring the embankment for any signs of distress or potentially hazardous conditions before filling the reservoir. Access for the remainder of the year would continue to be via stock or foot travel on Trail No. 96.

ALTERNATIVE 4-CONSTRUCTION OF BRIDGE AT FIRST STREAM CROSSING

This alternative consists of constructing a new bridge at the first stream crossing of Tin Cup Creek along Trail No. 96. This crossing is typically the most dangerous and difficult crossing for people and stock in early spring runoff during increased flow velocities in the stream channel. Immediately downstream of this crossing, the gradient of the stream channel increases and the cross section narrows through a rocky chute. If people or stock lose their footing while crossing the stream at this location, they could be carried downstream through the rocky channel below. The combination of flow velocities and steeper channel gradients would make it difficult for both people and stock to get out, and likely cause serious injury or death.

Because the span at the first crossing of Tin Cup Creek is approximately 60 feet long, a packable bridge would not be adequate. (The limit on span length for a packable bridge is approx. 36 feet). The required width for stock is 6 to 7 feet wide, with curbs or rails, respectively. This alternative would include approximately 4 helicopter trips to transport the stringers to the site.

This alternative is similar to alternative 2 in that it eliminates the first hazardous creek crossing for personnel and stock, but does not mitigate the second and third crossings or the potential avalanche hazards along sections of the trail further up the drainage.

ALTERNATIVE 5-CLOSING THE HEADGATE IN THE FALL

This alternative consists of closing the headgate in the fall when the trail is typically clear of snow and the water in the creek crossing is low. Therefore, no special access provisions would be authorized under this special use permit.

Alternative 5 eliminates the hazards to personnel accessing the dam in early spring. However, this alternative potentially affects the long term performance of the dam embankment. There are several reasons for not closing the headgate in the fall: 1) an empty reservoir does not present a risk to downstream life and property, and 2) reduced storage time decreases the degree of saturation of the embankment, which increases the reliability of the structure, 3) damage from freeze/thaw cycles and wave action is

reduced, etc. Additional information regarding the timeframe for closing the headgate is included under key topics (dam safety and public safety) and in Appendix D.

MITIGATION MEASURES, TERMS AND CONDITIONS, MONITORING REQUIREMENTS AND PERMITS REQUIRED FOR THE PROPOSED ACTION

Mitigation measures are those controls or guidelines that reduce or eliminate adverse effects of management activities. Monitoring is the gathering of information and observation of management activities to provide a basis for confirming that work is accomplished as designed and that mitigation measures are effective.

In addition to Forest Service policy and Forest Plan requirements, the interdisciplinary team identified project-specific mitigation measures and other plans and specifications that would be required. The environmental impacts of the proposed action discussion are based on implementation of the listed mitigation measures. Terms and conditions describe mitigation and monitoring items that will be required of TCCWSD.

The terms and conditions and mitigation measures required for the proposed action alternative are displayed on the following Table 1.

The following items are TCCWSD's Responsibility:

Table 1 Terms and Conditions (TCCWSD)

Tin Cup Lake Access – Terms and Conditions
Dam Safety
1. TCCWSD will have an updated Emergency Action Plan in place to respond to potentially hazardous situations or emergency conditions, such as excessive seepage or potential flooding conditions caused from heavy rain or heavy runoff from snowmelt.
2. TCCWSD will provide a schedule in advance of maintenance work to be accomplished at Tin Cup Dam, then, at the end of each field season, will also submit an account of the operation and maintenance work that was accomplished in the form of an operations log. Any unusual or potentially hazardous conditions will be monitored and reported to appropriate Forest Service personnel as outlined in the Tin Cup Dam Emergency Action Plan.
Wilderness Resource, Recreation and Wildlife
3. All flights will be limited to the timeframe between April 1 and May 15. Airlift flights in the valley will be routed to minimize noise near residences. When possible helicopters will avoid flying directly over trails.
4. Pilots will minimize potential helicopter disturbance to peregrine falcons and mountain goats by restricting the flight path to the south side of the canyon for the first three miles (until the canyon bends to the south).
5. Schedule helicopter use and other motorized equipment to weekdays and non-holiday days if possible.
6. Tin Cup Trailhead will be posted, alerting the public to the helicopter activity. If flights require sling loads, trail closures may be posted for public safety.
7. All solid wastes will be removed from National Forest lands.
Water and Fisheries
8. Bridge abutments will not constrict stream flow. Utilize large, stable boulders in place where possible.
9. Construction of a new ford (if needed) will be during late summer low flows – Alternative 2
10. Any needed construction shall not impede aquatic organism passage. – Alternative 2 and 4
11. Practicable & effective erosion control devices would be included in any trail construction, to prevent both trail down cutting and delivery of trail sediments to the stream. Approaches would be hardened as needed.
12. Rehabilitate the old crossing & trail to the extent possible.

Tin Cup Lake Access – Terms and Conditions	
Heritage Resource	
13.	If previously unknown sites are discovered during implementation , project activities in the vicinity of the site must be halted and the Forest’
Revegetation and Reclamation	
14.	All equipment and supplies will be inspected and cleaned of weed-seed prior to entering the wilderness.
15.	Use certified weed-free feed for stock used to access dam. (Alternatives 1,2, 4,5)
16.	Feed Stock certified weed-free feed for several days prior to entering National Forest lands. Brush animals to remove weed seed prior to entering NF lands. (Alternatives 1,2,4,5).
17.	While in the backcountry, tie stock in a manner that minimizes soil disturbance and loss of native vegetation. (Alternatives 1,2,4,5).
18.	Inspect, and remove and properly dispose of weed seed found on clothing and equipment. (Alt 1-5)
19.	Use weed-free helibases when flying into the wilderness. (Alternatives 3 and 4).
20.	Inspect, remove and properly dispose of weed seed found on cargo netting used for transporting materials into the Wilderness. (Alternatives 3-4).
Permits and Plans	
21.	Depending on the final design, Alternative 2 or 4 may require: <ul style="list-style-type: none"> • CWA s404 permit for dredge and fill in water bodies of US from the US Army Corp of Engineers (mandatory), • 310 permit (Montana Natural Streambed and Land Preservation Act) for operations near a stream or wetland, from local Conservation District (mandatory, 128 permit if agency-led), • 318 authorization for unavoidable short-term water quality violation of turbidity standard, from MTDEQ (Highly recommended),
All permit application work is the responsibility of the TCCW&SD as project proponent.	

ENVIRONMENTAL MONITORING

Monitoring is the gathering of information and observation of management activities to provide a basis for periodic evaluation of Forest Plan goals and objectives and includes administration of this project. The purpose is to determine how well objectives have been met and how closely management standards and mitigation measures have been applied.

Monitoring and Inspection that is TCCWSD’s Responsibility

TCCWSD will provide an annual schedule of operation and maintenance activities to be accomplished. At the end of the field season, TCCWSD will submit an annual operations log that describes the operation and maintenance that was completed on the dam.

TCCWSD will report immediately to the Forest Service any signs of distress or hazardous conditions that are discovered during their routine operation and maintenance work on the dam. This notification process is included in the Emergency Action Plan developed for Tin Cup Dam. This document will be updated on a routine basis.

Monitoring that is Forest Service’s Responsibility

A Forest Service engineer will monitor the both the schedule of work and annual operation and maintenance activities submitted in an annual log.

The wilderness ranger will provide feedback to ensure access and project work meet mitigation and protection standards.

Other Alternatives Not Given Detailed Study

In the course of evaluating TCCWSD's request and prior to scoping, the Forest explored a number of access alternatives that were made available at time of scoping (PF C-01). These concepts were evaluated and helped lead to the design of the proposed action. Public comments on the proposal did not offer any additional alternative access scenario suggestions (DN-Appendix A)

In all, these scenarios ranged from considerations of whether the site could be accessed solely through non-mechanized means to other scenarios such as building a bridge or considering closing the headgate in the fall instead of in the spring. These scenarios were formulated into alternatives 1 through 5 and are included in this analysis (see Pages 7-9). Additionally, a lower standard, or sub-standard, trail was considered. This sub-standard trail would be constructed specifically for TCCWSD personnel only. However, the trail is likely to be used by the general public at times, and the intent of exclusive use by TCCWSD could not be enforced. This situation could potentially result in resource damage particularly by stock through the wet, boggy terrain where the trail would need to be re-routed in order to avoid the hazardous creek crossing. For those reasons, the sub-standard trail was not analyzed in detail.

The sixth alternative, building an 8 foot wide road from Tin Cup Trailhead to Tin Cup Lake, was considered but not given detailed study. There are reasonable, feasible and viable means of access suitable to the current proposal which would result in fewer and less severe impacts on the public resources.

EXISTING CONDITION AND ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

This section provides an analysis of the key environmental impacts of the alternatives as described in the specialist reports prepared for this project. It provides the necessary information to determine whether or not to prepare an Environmental Impact Statement. The analysis and conclusions about the potential effects are synopsized and cited below. Additional information is contained in the specialists' reports, which are available in the Project File, located at the Supervisor's Office in Hamilton, Montana.

Generally, the affected area for this proposed project is within the Tin Cup Creek drainage. However, the analysis area for the project may vary by resource, and changes to the analysis area will be noted in the resource specialist report.

Effects of similar and more extensive past wilderness dam repairs (Mill Lake Dam, Canyon and Wyant Lake Dams, Tin Cup Lake Dam and Bass Lake Dam) can be obtained from the Bitterroot National Forest website which can be viewed at <http://www.fs.fed.us/r1/bitterroot/planning/tincup.htm>.

Key Topics

Dam Safety

Affected Environment

Dams can have serious affects on people, property and the environment, which extend far beyond the property of the dam owner. Tin Cup Dam is currently classified as a moderate hazard dam based on the potential consequences of failure (*"Hazard Potential Classification, Tin Cup Dam, Bitterroot National Forest"* by Wayne J. Graham, P.E., Bureau of Reclamation, September 10, 2003). The hazard designation is based on the consequences of a dam failure and is not an assessment of the condition of the dam. A moderate hazard dam is a dam "built in areas where failure would result in serious environmental damage or appreciable economic loss with damage to improvement, such as commercial and industrial structures, public utilities and transportation systems. No urban development and no more than a small number of habitable structures are involved. Loss of human life would be unlikely." (Forest Service Manual 7511.2). In his assessment of Tin Cup Dam, Mr. Graham, a recognized expert in assessing hazard classifications, concludes that:

"The failure of Tin Cup Dam would result in flood water traveling about 14.5 miles before reaching the area immediately south of Darby, Montana. U.S. Highway 93 might be overtopped as a result of the dam failure flooding. Up to perhaps 15 residences could experience shallow flood depths, and experience some damage, as the dam failure flooding spreads

out and covers an area that might be 1,000 to 2,000 feet in width. Up to about 50 people could be at risk.

The preponderance of dam failure data suggests that the failure of Tin Cup Dam would not likely cause a loss of life. Stated in another way, loss of human life would be unlikely as a result of failure of Tin Cup Dam. A hazard classification of moderate should be assigned to Tin Cup Dam based on the definitions and guidance contained in Forest Service Manual, Section 7511.2.”

Even though Tin Cup Dam is currently classified as a moderate hazard dam, there are no absolute guarantees that a failure of Tin Cup Dam would not result in loss of life. Mr. Graham recognizes that “*There is much uncertainty regarding the appropriate breach parameters to use at Tin Cup Dam.*” These breach parameters affect the extent of the breach and how fast it occurs. In addition, there is likely to be serious environmental damage immediately downstream of the dam, appreciable economic loss and property damage due to shallow flooding, which TCCWSD would be held liable. Based on this information, TCCWSD has made the conservative decision to manage the dam as a high hazard dam.

The desired condition for Tin Cup Dam from a dam safety perspective is a safe, durable dam that is operated, maintained and repaired in accordance with current federal dam safety laws and standards. In addition to providing a safe and reliable source for irrigation water to downstream users, the dam provides other public benefits. Benefits include the recharge of critical groundwater aquifers from irrigation water, improving riparian areas for wildlife habitat during late summer when discharges from the dam storage augments low flows in Tin Cup Creek, and securing a water source for future development needs in the Darby area.

Dam Safety and Public Safety - Regulatory Consistency

Alternative 1 does not promote a responsive and effective operation and maintenance program, which is not consistent with dam safety laws, regulations and policy.

Alternative 2 improves access conditions at the first stream crossing for TCCWSD personnel to operate and maintain Tin Cup Lake Dam, but this alternative still exposes TCCWSD personnel to unnecessary risk of avalanche hazards along Tin Cup Trail, in addition to the high flows at the next two stream crossings.

Alternative 3 is consistent with dam safety laws, regulations and policy because this alternative improves the safety and long-term performance of the dam, which ultimately affects public health and safety of people and property located within the inundation zone downstream Tin Cup Lake Dam. (Refer to information in the Dam Safety Section under Key Topics). Additionally, Alternative 3 benefits the personal safety of TCCWSD representatives accessing the dam during early spring when conditions along the trail are

typically hazardous because of heavy snow pack conditions and potential for avalanche occurrences, or high stream flows causing difficult or treacherous conditions while crossing Tin Cup Creek on foot or stock.

Alternative 4 is similar to Alternative 2 in that it improves access conditions at the first stream crossing, but Alternative 4 still exposes TCCWSD personnel to unnecessary risk of avalanche hazards along Tin Cup Trail, in addition to high flows at the next two stream crossings.

Alternative 5 is not consistent with correcting deficient practices and recognizing TCCWSD's responsibility to operate and maintain their Tin Cup Lake Dam in a manner that provides the greatest assurance of public safety.

Refer to Appendix A for discussion of authorities to regulate dams on National Forest System Lands. Also refer to Appendix D for additional information related to TCCWSD's responsibilities and liability associated with dam ownership.

Effects on Public Health and Safety

Alternative 1 does not provide adequate access during the time of year when members of Tin Cup County Water and/or Sewer District (TCCWSD) close the control gate (headgate) to store water for irrigation purposes. Within the last few years, TCCWSD has made an operational change to close the control gate in the spring, typically around mid-April, to decrease the amount of time water is retained behind the dam. This reduced storage time decreases the degree of saturation of the embankment, therefore increasing its reliability. Also, because the dam is fine grained and lacks adequate erosion protection, reducing the storage time significantly reduces erosion on the dam face. In addition, freeze/thaw effects are significantly reduced on the control gate and outlet works (see alternative 3 for more information related to this operational change).

Personnel from TCCWSD have notified the Forest Service that accessing the dam during early spring to close the headgate exposes TCCWSD personnel to unnecessary risk, which include high creek flows and extreme avalanche hazards along Tin Cup Trail. Representatives from Tin Cup County Water and/or Sewer District have also pointed out that there is a limited window of opportunity for closing the control gate before the reservoir overtops the rock ring barrier and draws debris into the control gate. Other problems have developed in that past because of large logs getting hung up in the cables which anchor the trashrack structure. The combination of large logs and wave action would threaten the gate stem, which, if bent, would prevent the operation of the headgate.

TCCWSD monitors the reservoir level by fixed wing flight in order to determine the opportune time to close the headgate. If TCCWSD is not authorized to access their dam by helicopter and they make an attempt to access on foot or stock, and if conditions are such that they determine not to risk crossing the stream or avalanche path run-outs, this situation could delay the closure of the headgate within the critical timeframe, and the reservoir could overtop the rock ring and draw logs or debris into the headgate. This

situation could render the headgate inoperable, plug the outlet pipe and prevent the gate from being fully operational in the event of emergency conditions.

Alternative 2 improves the access conditions by re-routing the trail away from the hazardous crossing and constructing a new ford in a location where the stream gradient is reduced. However, this alternative does not address potential hazards along the trail in areas of historical avalanche activity. Several active chutes cross the trail, and TCCWSD personnel have notified the Forest Service of these occurrences in the past, including a recent event that deposited logs and debris in the reservoir around the dam. This resulted in an accumulation of woody debris on the upstream embankment, within the spillway flow channel, and around the control gate structure.

Alternative 3 provides helicopter access during early spring when conditions along the trail are typically hazardous because of heavy snow pack conditions and potential for avalanche occurrences, or high stream flows causing difficult or treacherous conditions while crossing Tin Cup Creek on foot or stock. This alternative not only benefits the personal safety of TCCWSD representatives accessing the dam, but also benefits the long term safety and performance of the dam embankment and outlet works - which ultimately affects public health and safety of people and property located within the inundation zone downstream Tin Cup Lake Dam.

There are several factors related to the safety of Tin Cup Lake Dam which influence the decision of TCCWSD to close their control gate in the spring. This operational strategy improves the safety of the dam for the following reasons: 1) minimizes the amount of time that the reservoir is against the dam, which reduces the time of exposure and risk of dam failure by several months during the year, 2) reduces the risk of dam failure caused by piping and internal erosion of the embankment materials because there is no hydraulic gradient driving this failure mechanism, 3) minimizes slope failure due to saturation of the embankment toe, typically occurring at high reservoir levels, 4) reduces the risk of overtopping the dam because of high inflow or a spillway plugged with debris and ice, 5) reduces erosion on the upstream embankment caused by frost heave, wave action and accumulation of debris 6) prevents large logs from floating into the trashrack and supporting cable system, which could bend the gate stem and affect the ability to open and close the headgate, 7) minimizes buildup of ice and freeze/thaw damage to the control gate and trashrack structure, and 8) provides an opportunity for TCCWSD personnel to observe any potential hazards affecting embankment stability (sinkholes, slides, cracks, rodent holes, debris in the intake structure, etc.) that have developed through the fall and winter months before filling the reservoir.

NOTE: These factors listed above improve the overall condition of the dam by eliminating several elements that accelerate the deterioration of the dam. Closing the control gate in the spring also reduces the time of exposure or risk of dam failure by several months during the year, and therefore, provides a benefit related to protection of public health and safety. These benefits related to dam safety, or public safety, are common to other Alternatives (including 1, 2 and 4) if TCCWSD personnel are able to access the dam and close the headgate within the critical timeframe.

Alternative 4 also provides improved access conditions at the first crossing of Tin Cup Creek (similar to Alternative 2). However, this alternative does not address potential hazards along the trail in areas of historical avalanche activity. Several active chutes cross the trail, and TCCWSD personnel have notified the Forest Service of these occurrences in the past, particularly activity that has occurred within recent years that caused logs and debris to accumulate upstream of the dam and block the spillway flow channel.

Alternative 5 eliminates the potential hazards related to avalanches and creek crossings during high flows because the control gate would be closed in the fall. However, this alternative affects the long term performance of the dam embankment and the health and safety of people and property located downstream in the inundation area for Tin Cup Lake Dam. Several factors related to the safety of the dam were listed under Alternative 3 above. Alternative 5 presents just the opposite of these benefits.

For example, if the control gate is closed in the fall, then: 1) a full reservoir saturates the embankment and increases the time of exposure to downstream life and property by increasing the length of time that the dam could actually fail, 2) increases the potential risk of dam failure caused by piping and internal erosion of the embankment materials because of the reservoir head and hydraulic gradient driving this failure mechanism, 3) increases the potential for slope failure due to saturation of the embankment toe, typically occurring at high reservoir levels, 4) increases the risk of overtopping the dam because of high inflow or a spillway plugged with debris and ice, 5) increases erosion on the upstream embankment caused by frost heave, wave action and accumulation of debris 6) increases the potential for large logs causing damage to the trashrack and supporting cable system, which could bend the gate stem and affect the ability to open and close the headgate, 7) increases the buildup of ice and freeze/thaw damage to the control gate and trashrack structure, and 8) eliminates the opportunity for TCCWSD personnel to visually inspect and repair any potential hazards affecting embankment stability (sinkholes, slides, cracks, rodent holes, debris in the intake structure, etc.) that have developed through the fall and winter months before closing the headgate and filling the reservoir.

All of these factors not only detrimentally affect the long term performance and safety of the structure, but also affect the ability of TCCWSD to observe and monitor any unusual or hazardous embankment conditions that may have developed through the fall and winter months prior to filling the reservoir. Once the reservoir fills, it is difficult to inspect any problems or hazardous conditions on the upstream side of the embankment, such as rodent holes, sinkholes, obstructions to operating the control gate, etc. (Please refer to Appendix D for additional information, including the responsibility and liability associated with dam ownership).

Additional Considerations

Currently, there are two options under which mechanized access to the dam is granted:

1. Declare an emergency: Emergency action which requires immediate access to the dam within minutes or hours. Media notification usually accompanies such a declaration. An assessment is conducted in an expedient manner. Condition of the dam is addressed.
2. Do not declare an emergency: Operation and maintenance action. No immediate access until a decision and minimum requirements analyses are completed. This action and the corresponding access usually requires a few days. Access is postponed as is the assessment of the condition of the dam.

In conclusion, Alternative 3 would also provide a means of accommodating the two existing options in situations requiring immediate attention.

Access

Affected Environment

Tin Cup Lake Dam is located in the southeast quarter of Section 1, Township 2 North, Range 23 West, P.M.M., which is approximately 14 miles southwest of Darby, Montana. The dam is located approximately 7 miles inside the Selway-Bitterroot Wilderness boundary near the head of Tin Cup Creek. Public access to Tin Cup Lake Dam is by Trail # 96 which originates near the end of Road #639 west of Darby. Distance to the lake from the trailhead is approximately 10 miles. See pages 29-36 for details of trail condition. Refer to the section entitled “Purpose and Need for Action” at the beginning of this document for a discussion of legal rights of TCCWSD to access Tin Cup Lake Dam.

Access and Easements Regulatory Framework

Refer to the section under “Purpose and Need for Action” at the beginning of this document, and PF G-13 for a discussion of legal rights associated with TCCWSD’s ability to access this valid occupancy.

Effects on Access

Alternative 1 does not meet the purpose and need to access Tin Cup Lake Dam because it does not provide the dam owner with adequate access during the critical timeframe for closing the control gate from a dam safety perspective. This alternative does not address the issues related to closing the headgate in the fall, which is included in Alternative 5. Therefore, this alternative is limited to accessing the dam during a limited window of time between the start of snowmelt when the reservoir starts to fill and before the reservoir overtops the rock barrier around the control gate and trashrack structure.

There are potential hazards on Tin Cup Trail for personnel accessing the dam by foot or on stock specifically during this timeframe in early spring. These potential hazards are described above under the effects on public health and safety. In addition, personnel from TCCWSD have had difficulty in the past with early access because of trees blown down across the trail. The Forest Service trail crew normally clears the trail in mid to late June. Access after that time is not timely for TCCWSD in closing the control gate.

Once the headgate is closed and after the snowpack and the high creek flows recede, routine access for operation and maintenance activities continues to be on foot or stock via Trail No. 96.

Alternative 2 would alter the existing route for approximately 1000 lineal feet along Tin Cup Trail No. 96. This alternative improves user access by eliminating the hazardous creek crossing and moving it to a section of stream where the gradient and resulting flow velocities are reduced, and therefore, the crossing is less treacherous. However, the

effect on user access for this alternative may create other potential problems caused by the marshy, boggy terrain through which the new trail would need to be relocated.

In **Alternative 3**, TCCWSD would be authorized to access their dam by helicopter specifically for the purpose of operating and maintaining Tin Cup Lake Dam. This alternative improves the ability of TCCWSD to access their dam within the desired timeframe. The number of helicopter trips would be limited to a maximum of two trips within a specific timeframe. This timeframe is limited from April 1 through May 15 when trail conditions are typically hazardous because of the amount of snowpack and potential for avalanche occurrences or the problem with high creek flows, primarily at the first crossing of Tin Cup Creek along Trail No. 96.

This alternative provides the owner and operator of Tin Cup Lake Dam with reasonable access in meeting their legal responsibilities related to the general standard of care of their dam. TCCWSD has presented their concerns related to legal liability issues and timely operations to maintain a safe structure. This alternative respects their obligations as the responsible party in the event of a dam failure, or an uncontrolled release of reservoir water.

Difficult access conditions because of heavy snowpack and high water flows in Tin Cup Creek in April and early May make it unlikely that wilderness visitors will be adversely affected by the intruding sights and sounds of two round-trips helicopter trips.

Alternative 4 improves the hazardous access conditions for TCCWSD to operate and maintain their dam facility in early spring. This alternative would also provide for improved user access for the general public at the first crossing of Tin Cup Creek along Trail No. 96 because the hazardous ford would be replaced with a bridge suitable for people and stock.

Alternative 5 does not include impacts to user access for the general public. However, this alternative restricts TCCWSD's ability to reasonably access their facility during a limited timeframe. This restriction does not provide for the optimum care of the dam facility as described above under the effects on public health and safety.

Refer to Appendices A, D, and PF G-13 for Consistency and Regulatory framework for access.

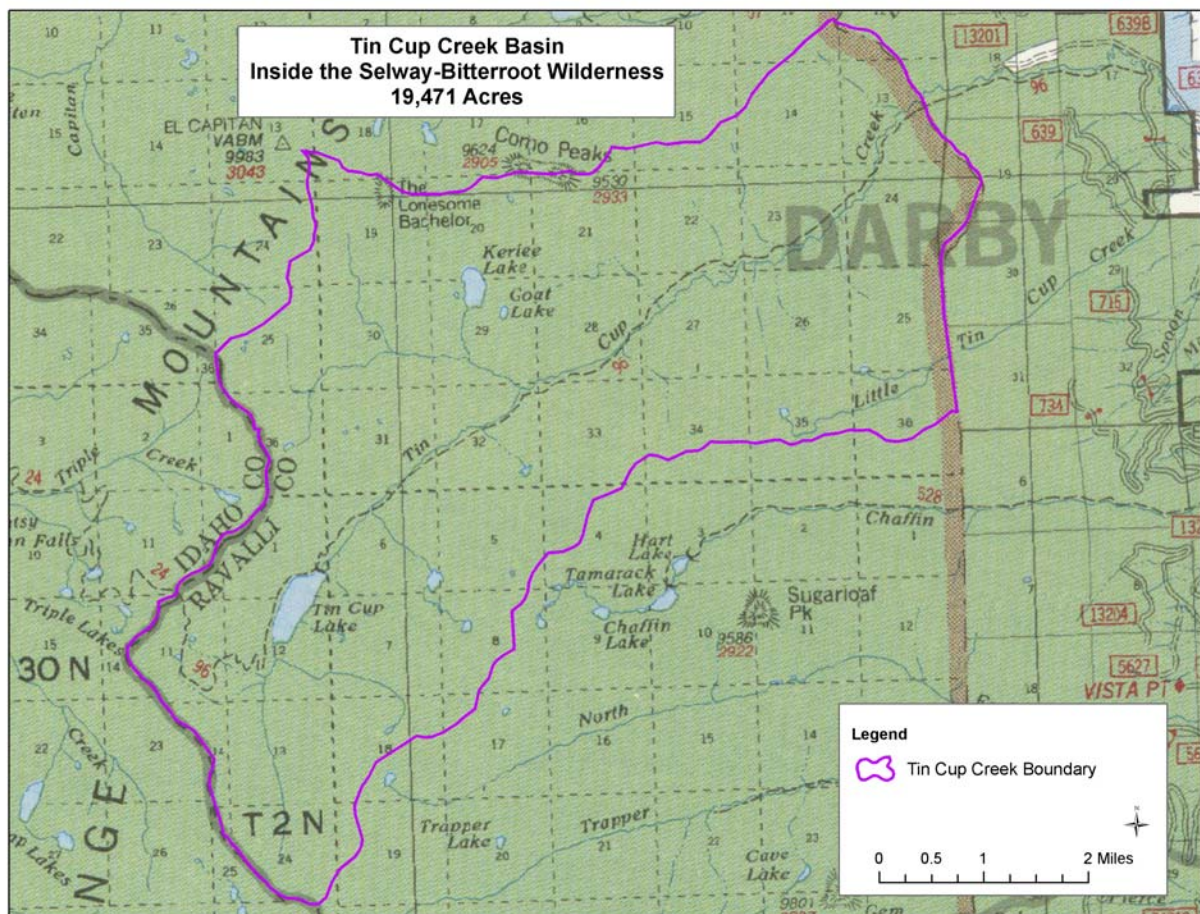
Wilderness and Recreation

Wilderness and Recreation Affected Environment

Existing Condition

The Tin Cup Lake Dam is located at the headwaters of Tin Cup Creek near the Montana-Idaho border, approximately 14 miles southwest of Darby, Montana. The dam and lake are in the Selway-Bitterroot Wilderness. Public access to Tin Cup Lake is by Tin Cup Trail # 96. Distance to the lake from the trailhead is approximately 10 miles. The area of analysis for the proposed project is the Tin Cup drainage from its headwaters to the wilderness boundary, (approximately 7 miles) and also from the wilderness boundary to the Tin Cup trailhead, (approximately 3 miles) because the potential direct and indirect effects of the proposal are generally well contained within this watershed boundary. Some discussions of the larger wilderness setting are included to provide context to these effects. The analysis area includes Tin Cup Trail #96. The Tin Cup drainage area in wilderness is approximately 19,471 acres in size. See Map #2.

Map #2



Wilderness

The Selway-Bitterroot Wilderness lies within the Bitterroot, Nez Perce, Clearwater and Lolo National Forests. General management direction for the Selway Bitterroot Wilderness is contained in the SBW General Management Direction (Forest Plan Amendment #7, 1992), (PF G-15). This document is included as an appendix to each of the four forest plans. The Selway-Bitterroot Wilderness, third largest wilderness in the lower 48 states, totals 1.3 million acres and the Bitterroot National Forest contains 508,000 acres of this total.

A unique characteristic of this wilderness is the presence of sixteen irrigation dams all established before the 1964 Wilderness Act and some established before designation of the Bitterroot National Forest.

General wilderness characteristics of this drainage are summarized in six categories:

1. Natural integrity refers to the extent to which long-term processes are intact and operating, and is measured by the presence and magnitude of human induced change. The impacts of human activity are generally light, with the exception of the Tin Cup Dam, Tin Cup Trail #96 and campsites.
2. Apparent naturalness is indicated by how the environment looks to most people using the area. Human activities are primarily confined to the narrow trail corridor and the area immediately adjacent to the dam and reservoir. The remainder of the area is topographically extreme and discourages human activity.
3. Remoteness is a perceived condition of being secluded, inaccessible and out of the way. The presence of humans is apparent in the trail corridor and immediate lake area. Any remoteness is experienced due to topographic relief and vegetation screening and increases as one gets further up Tin Cup trail #96.
4. Solitude is a personal, subjective value defined as isolation from the sight, sound and presence of others and the developments of humans. The feeling of solitude in its purest sense is not available within the trail corridor or lake basin. Encounters are more frequent within the first few miles of Tin Cup Trail #96 and decrease as one gets closer to the lake.
5. Special features are those unique geological, ecological, cultural or scenic features that may be located in Wilderness. Notable features include spectacular scenery, air quality, wildlife and opportunities for wilderness related activities. Some people view the dams within the wilderness as important cultural artifacts. Reminders of our early day settlers to the Bitterroot Valley and how these helped carve out a lifestyle.
6. Manageability and Boundaries – The Selway Bitterroot Wilderness lies within the Nez Perce, Clearwater, Bitterroot and Lolo National Forests. General Management direction for the SBW is contained in the SBW General

Management Direction prepared by the four forests in 1992. This document was included as an appendix into each Forest Plan and wilderness management standards in the individual plans were based on it.

The wilderness is divided into four Opportunity Classes (OC) developed to allow for and provide a range of wilderness experiences, from the most pristine Opportunity Class 1 to most heavily used Opportunity Class 4. By allocating different opportunity classes, overall degradation of the wilderness resource can be prevented, while simultaneously establishing realistic objectives for those areas that receive more use, and consequently more impacts. However, each area will be managed to meet the limits of acceptable change prescribed for its designated opportunity class. The opportunity class descriptions provide managers with a hypothetical framework for managing towards the desired further conditions for the wilderness and by outlining the desired resource, social and managerial settings. These descriptions are described in narrative form in the SBW General Management Direction on pages A-3 to A-6 and B-2 as well as summarized on Tables A-1 (page A-2), and A-2 (page A-7) (PF G-15).

The affected environment is in Opportunity Class 4. Although the natural environment is generally unmodified, there are many locations substantially affected by the actions of users. Environmental impacts are relatively high in areas along major travel routes. Impacts often persist from year to year, and there may be vegetation loss and soil disturbance at some sites. Opportunity Class 4 allows for some sign of human modification and more human interaction than would be expected in pristine areas. Visitors can expect to encounter other users on the trail and at campsites, and to have a reduced opportunity to experience solitude or remoteness. The Tin Cup drainage receives relatively high use during the summer season but low use in late spring, late fall and winter.

A few campsites in the Tin Cup drainage have baseline monitoring information dating back to the 1970's, but trend information on the entire drainage is limited. All sites were monitored during the early 1990's using the Cole Site Inventory Worksheet method. Seven sites are located around Tin Cup Lake and four of these were re-inventoried in 2004-2005 (all recently used sites). Two main sites on the east end of the lake and an outfitter camp on the west end of the lake have remained extremely impacted through the decade. Forest Plan Standards for this area call for no more than 4 campsites total and maximum impacts of 1 heavy or extreme, 2 moderate and 1 light. The Tin Cup Lake area exceeds these standards by 3 campsites in a square mile and by 2 extreme, 1 moderate and 1 light impact rating.

This decade of monitoring covered a period that included the partial breach and reconstruction of the Tin Cup dam. Work camps over multiple seasons were in place on the east end of the lake and public were displaced to the west end of the lake. The reconstruction has had other lasting effects on visitor use. There is more challenging access to the east end of the lake, particularly for stock users. A new and un-inventoried site is beginning on the steeper and more vegetated north side of the trail. The reduced water storage capacity has dramatically changed the high water shoreline on the east end

of the lake and new use is moving from the outfitter camp to recovering lakebed areas. Monitoring is planned for 2006 to collect baseline information on impacts related to the changing use patterns. See campsite inventory tracking sheet, (PF K-15).

Recreation

The Recreation Opportunity Spectrum (ROS) is a land management tool used to classify lands based on the different recreation settings they provide. The system considers several indicators when classifying an area of land including remoteness, access, naturalness, facilities and site management, social encounters, visitor impacts, and visitor management. The setting, activities, and opportunities for experiences have been arranged along a continuum divided into six classes: primitive, semi-primitive (motorized and non-motorized), roaded natural, rural and urban (USDA Forest Service ROS users Guide). The Tin Cup drainage portion outside wilderness is classified semi-primitive (motorized).

Tin Cup's proximity to Hamilton and Darby make it a popular day and overnight use area during the snow-free season. Visitors have diverse recreational opportunities, including hiking, horseback riding, hunting, fishing, rock climbing and photography.

Consistency with Law, Regulations, Policy or Forest Plan

Wilderness - Regulatory Consistency

The Wilderness Act of 1964 directs that wilderness be administered "... for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness..." By definition wilderness has "outstanding opportunities for solitude or a primitive and unconfined type of recreation". (PF G-10).

The Wilderness Act of 1964 does not specifically address the method of access to wilderness dams. It does however, specifically address "valid occupancies" such as Tin Cup Dam. In Section 5(b) it states "In any case where valid mining claims or other valid occupancies are wholly within a designated forest wilderness area, the Secretary of Agriculture shall, by reasonable regulations consistent with the preservation of the area as wilderness, permit ingress and egress to such surrounding areas by means which have been or are being customarily enjoyed with respect to such other areas similarly situated."

The Act specifically addresses motorized/mechanized prohibitions stating "...except as necessary to meet requirements for the administration of the area for the purposes of this Act there shall be no...use of motor vehicles...no landing of Aircraft, no other form of mechanical transport" [sec.4(c)].

The Forest Service Manual 2300-90-1, 2326.1 – Conditions Under Which Use May be Approved allows the use of motorized equipment or mechanical transport when: A). a delivery or application problem necessary to meet wilderness objectives cannot be

resolved within reason through the use of non-motorized methods. B). an essential activity is impossible to accomplish by non-motorized means because of such factors as time or season limitations, safety or other material restrictions.

The project is located in the Forest Plan Management Area 7c. The goals for Management Area 7c are to "manage in accordance with the Wilderness Act of 1964... to ensure an enduring system of high quality Wilderness..."

Direction for the management of the Wilderness portion of the affected area is contained in the Selway-Bitterroot Wilderness General Forest Plan Management Direction (Forest Plan Amendment #7, 1992) (PF G-15). This amendment established the following goals for the Selway-Bitterroot Wilderness.

- Preserve the integrity of the Selway-Bitterroot Wilderness resource to meet the purposes described in the Wilderness Act; to protect and preserve natural conditions so that the wilderness generally appears to have been affected primarily by the forces of nature, with the imprint of human work substantially unnoticeable, and has outstanding opportunities for solitude or primitive and unconfined recreation.
- Provide for limiting and distributing visitor use of specific portions in accordance with periodic estimates of the maximum levels of use that allow natural processes to operate freely and that do not impair the values for which wildernesses were created.
- Apply a Prevention of Significant Deterioration (PSD) approach to prevent a net degradation of the wilderness resource while acknowledging that wilderness, and the impacts caused therein, is dynamic.

The Bitterroot National Forest Plan notes in Amendment #7, page M-1 (PF G-15) that many special use dams exist in the Wilderness, that they need to be maintained to a safe condition, and may need mechanical access and motorized equipment to maintain at least some of them.

The Bitterroot National Forest Plan specifies in Amendment #7, Section II, M-2 (PF G-15): Environmental assessments or environmental statements will be prepared for all reconstruction and heavy maintenance work on reservoirs within the wilderness. These reports will include analysis of non-motorized vs. motorized means of doing work. Motorized equipment or other non-conforming activities will be authorized when it can be demonstrated that:

- It is the only feasible means of accomplishing the necessary maintenance.
- The continued existence of the reservoir is more in the public interest than its breaching.

Feasibility for the use of primitive equipment will be based on the technical requirements of the project.

Section II, A-1 specifies: “The minimum tool principle will be applied to the management of all resources within the Selway Bitterroot Wilderness. This means that the minimum management actions necessary to correct a given problem will be identified. These will be implemented using the methods and equipment that accomplish the objective with the least impact on the physical, biological and social characteristics of wilderness.”

A Minimum Requirements Decision Process was used to evaluate the minimum tool necessary to accomplish proposed work and methods of access. See Appendix B for the Minimum Requirements Document.

Wilderness and Recreation Consequences of Alternatives

Introduction

This section will discuss and disclose the environmental effects of this project on the wilderness and recreation resources of the Tin Cup Creek drainage from its headwaters to the wilderness boundary, (approximately 7 miles) and also from the wilderness boundary to the Tin Cup trailhead, (approximately 3 miles). This area in wilderness is approximately 19, 471 acres. See Map # 2.

Effects are measured using parameters determined through public scoping and by using criteria in the Forest Plan (1987), and in the Selway Bitterroot Wilderness General Forest Plan Management Direction (Amendment #7). These documents disclose standards and management direction for the Selway Bitterroot Wilderness, and recreation.

The environmental consequences of each alternative will be discussed and evaluated the following way: the wilderness resource setting (natural integrity, apparent naturalness, remoteness, solitude and special features), and the general recreation setting.

Effects Common to All Alternatives

In all alternatives, the presence of Tin Cup Dam affects the wilderness resource. The natural integrity of water flows is restricted by the storage and release of water from the reservoirs. Apparent naturalness and visitor’s need of remoteness are affected by visual evidence of human structure. These effects are considered acceptable within the parameters of the Wilderness Act and subsequent legislation because Congress recognized these irrigation facilities existed at the time of the Wilderness Act and as required by both the Wilderness Act and ANILCA access to valid occupancies such as these dam facilities held by the TCCWSD is required (See PF G-10, G-12).

The Tin Cup drainage is in Opportunity Class 4 and receives relatively high use during the summer season but low use in mid April to mid-May. Opportunity Class 4 allows for some sign of human modification and more human interaction than would be expected in pristine areas. Visitors can expect to see some human impacts that persist from year to year, to encounter other users on the trail and at campsites, and to have a reduced opportunity to experience solitude or remoteness.

Wilderness and Recreation Resource

Alternative 1 – No Action

Direct and Indirect Effects

See effects common to all alternatives. This alternative would have no effect to the visitor's expectations of naturalness, remoteness and solitude or to their recreation experience in the short term. However, in the long term, if the dam is not maintained as required by Federal Dam safety requirements there is the possibility of developing problems associated with the outlet works. If the headgate cannot function properly, emergency situations may not be mitigated in a timely manner. The wilderness resource could be affected if the dam fails as a result of not being maintained properly. This could result in severe soil movement, drainage scouring and vegetation damage. This soil movement has the potential for effects to natural integrity (changing stream channels and opening areas to noxious weeds), apparent naturalness (as a result of trail or watershed repairs) and special features. Recreation access in the drainage could be affected for an extended period of time and would be costly to repair.

Alternative 2 – New Stream Crossing

Direct and Indirect Effects

Building a new stream crossing downstream from the existing one and rerouting the existing trail would have little effect on apparent naturalness, remoteness and solitude. The easier crossing may allow some earlier stock use and change use trends slightly but these folks would soon be turned back by snow and the additional crossings as they traveled up the drainage. Apparent naturalness is indicated by how the environment looks to most people using the area. The addition of a secondary trail that basically parallels Trail #96 would affect one's interpretation of that naturalness. Another indication of man's presence. Remoteness is a perceived condition of being secluded, inaccessible, and out of the way, while solitude is a personal, subjective value defined as isolation from the sights, sounds, and presence of others and the developments of man. Neither of these would be affected by this alternative.

Alternative 3 – Proposed Action

Direct and Indirect Effects

Visitor expectations of naturalness, remoteness and solitude would be impacted by the sight and sound of the helicopter and its landing at the lake. Due to the hazardous first crossing of Tin Cup Creek, two additional crossings further up the trail and numerous avalanche chutes that hold snow on the trail until early summer the likelihood of hikers or stock users in the Tin Cup drainage at this time of year would be very low.

Mitigations for signing and pre-announcing when flights would occur will allow most potential users the opportunity for solitude and remoteness in the remaining 1.3 million acres of the SBW or another Wilderness area close by during this 1-2 days per year TCCWSD is allowed to access their dam by helicopter.

Alternative 4 – Bridge**Direct and Indirect Effects**

The use of a helicopter to deliver materials for a bridge to the work site would have minimal and temporary effects to the wilderness resource. Visitor expectations of naturalness, remoteness and solitude would be impacted by the sight and sound of the helicopter.

Construction and presence of a bridge would have some effect on apparent naturalness, remoteness and solitude. The easier crossing may allow some earlier stock use and change use trends slightly but these folks would soon be turned back by snow and the additional crossings as they traveled up the drainage. Apparent naturalness is indicated by how the environment looks to most people using the area. A bridge would be perceived as not apparently natural. Remoteness is a perceived condition of being secluded, inaccessible, and out of the way, while solitude is a personal, subjective value defined as an isolation from the sights, sounds, and presence of others and the developments of man. The remote quality of inaccessibility could be affected by this alternative, as the trail accessibility at this creek crossing would be increased in the spring. Solitude could be affected by an increase in encounters in the spring. A bridge would affect the unconfined nature of the recreation experience by providing safe access at this crossing.

Alternative 5 – Closing the Headgate in the Fall**Direct and Indirect Effects**

See effects common to all alternatives. This alternative would have no effect to the visitor's expectations of naturalness, remoteness and solitude or to their recreation experience in the short term. However, in the long term, if the dam is not maintained as required by Federal Dam safety requirements there is the possibility of developing problems associated with the outlet works. If the headgate cannot function properly, emergency situations may not be mitigated in a timely manner. The wilderness resource would be affected if the dam fails as a result of not being maintained properly. This could result in severe soil movement, drainage scouring and vegetation damage. This soil movement has the potential for effects to natural integrity (changing stream channels and opening areas to noxious weeds), apparent naturalness (as a result of trail or watershed repairs) and special features. Recreation access in the drainage could be affected for an extended period of time and would be costly to repair.

Cumulative Effects Common to All Alternatives

Because of the ephemeral and geographically limited nature of this proposal's effects on the Wilderness setting, there doesn't appear to be cumulative (overlapping in both time and space) with other past, present or reasonably foreseeable actions. But, there may be both concurrent, similar activities (Mill Lake dam, Canyon Dam, ongoing trail and dam maintenance, etc.) and reasonably foreseeable activities (trail and dam maintenance) in the broader Wilderness area. Additional future repairs on Tin Cup Dam have also been discussed, but we have not received a proposal yet and the nature and timing of the repairs are still speculative.

The Selway Bitterroot Wilderness includes approximately 1,340,360 acres. The Tin Cup Creek drainage is approximately 19,471 acres. Thus, the affected environment for the Tin Cup Lake Access project is approximately 1.45% of the entire Selway Bitterroot Wilderness. The proposal is for 1-2 flights in early to mid April when use is low to non-existent because of heavy snowfall and high water in Tin Cup Creek. Wilderness visitors would continue to have the opportunity to visit another portion of the remaining 1,329,077 acres within the SBW to obtain the wilderness experience they have come to expect.

Please refer to a listing of the Type of Actions Analyzed for the Tin Cup Lake Access project, PF K-16.

Other Resources

Trails Affected Environment

Existing Condition

Tin Cup Trail #96 is the only system trail in the Tin Cup drainage. One non-system route accesses a mountain lake basin, leaving Trail #96 near MP 7 and climbing approximately one mile north. Tin Cup trail originates at a minimally developed trailhead on FR #639 approximately 4 miles from Darby. The trail climbs gradually, passing Tin Cup Lake (MP 11) and terminates on the divide between Tin Cup and White Cap Creek at the junction of White Cap Trail #24. Total length is 15 miles. From the trailhead to MP 2.7, the trail crosses non-wilderness lands. The remainder lies within the Selway-Bitterroot Wilderness. The trail crosses Tin Cup Creek three times via fords of varying lengths: 92 feet at MP 3; 60 feet at MP 6; 50 feet at MP 9.4. There are no standard structures in place to aid users in crossing fords, at present.

Typical of other large drainages on the west side of the Bitterroot Valley, the Tin Cup trail follows alternating grades through long, rolling sections of canyon, or climbing through steep, more rocky pitches. Each time the trail fords Tin Cup Creek, aspect changes and trail conditions change as well with prolonged wet conditions on North aspects; more open, drier conditions occurring earlier in the season on South-facing sides. The flatter sections pass through wet, boggy areas with meandering stream gradient. They are poorly drained and heavily shaded by old growth timber. The climbs tend to need more drainage structures and tread reconstruction. Above MP 9, the trail crosses open, avalanche paths. In the past, snowslides have come off the ridges above and filled the trail with hard-packed snow and down trees. These slides will melt out later than any other sections of trail, complicating access to the dam.

Trail #96 is managed as a mainline route and maintained annually. Maintenance is done by Forest crews rather than by contract to allow for flexibility in clearing the route to the dam. Reconstruction work has been accomplished on two different segments: a) trailhead to MP 7; b) above Tin Cup Lake to the trail terminus. More backlog work is surveyed and planned in the future. It is expected that normal wear and tear will require additional work over the length of the trail in the future. Reconstruction work was done to pack and

saddle stock standard. In the past (1963, 1964 and 1968) a small dozer was walked up Trail #96 to do repairs at the dam. Evidence of the clearing and tread completed for passage is still visible at times as an 8-10' "roadway" with brush encroaching. Other sections of cut have sloughed in over time and resemble a trail tread.

Use numbers are primarily estimates including tallies coming from a registration box at the trailhead. During high water, day hikers use the trail only to the first ford. Once high water recedes and summer begins, Trail #96 sees its highest use. Daily fishing outings, swimming and hikes occur. Overnight backpacking trips seem popular. Often these users camp near MP 7 and access other destinations from there. Occasionally longer duration trips are made over to the Selway River drainage. Two commercial outfitters are authorized day use trail rides and overnight pack trips in the drainage. Occasionally, private hunting parties will pack in with stock to hunt the upper reaches of the drainage. Weekend use is typically heaviest during summer months.

Consistency with Law, Regulations, Policy or Forest Plan

The Wilderness Act (1964) provides umbrella direction for trails in wilderness. Section 2 (a): "In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify, all areas within the United States,...". This would suggest areas without trails are appropriate. Defining wilderness in Section 2 (c), the Act describes "a wilderness, in contrast with those areas where man and his own works dominate the landscape..." would infer that minimal trails, clearing, and structures would be less obtrusive to the viewer. It further states wilderness will be "untrammeled by man..." (unimpeded or not restricted). "An area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements..." suggesting that the potential for natural forces, like high water, influencing the timing for travel on a trail are appropriate in wilderness.

The descriptive sentences and phrases above tend to discourage manmade trails and bridges. More specific direction that could legitimize a transportation system is contained in FSM 2320: Wilderness Management; FSM 2350: Trail, River and Similar Recreation Opportunities and FSH 2309.18, Trails Management Handbook legitimizing a transportation system.

Wilderness management guidance refers to trails as "an acceptable improvement" and directs that trails "fit into the natural landscape as unobtrusively as possible." Bridges should be designed to "minimize the size and complexity of the structure. Provide or replace bridges only when no other route is reasonably available or when a stream can't be forded safely on foot or horseback "during the primary season of public use,..."

The Trail Management Handbook in editions from 1935 – 1991 outlines criteria for selecting trail locations and fords. The terms normal and main season of use are used in all direction on fords and bridge construction. The Handbook recommends a ford site for

pack and saddle traffic is suitable provided the velocity and depth of water in the ford is acceptable during the “normal use season”.

Under Wilderness Considerations, the Handbook directs necessary facilities appear to be part of the wilderness environment, not an intrusion upon it. Trails reflect the minimum requirements to achieve the goal of protecting users consistent with normal degree of difficulty the user would likely encounter during the main season of public use. The main use season on Tin Cup trail is typically after high water has receded.

Further management direction contained in the Trail Construction and Maintenance Notebook, 2300 Recreation, October 1996, 9623-2833-MTDC states: “Most fords are not designed to be used during high runoff, but are intended to be used when flows are moderate to low.” If access to Tin Cup dam is needed during high water, then by design a ford was never intended to provide access across Tin Cup Creek.

The Trails Management Handbook (1991), Wilderness Considerations directs that necessary facilities appear to be part of the wilderness environment, not an intrusion upon it. The Bitterroot Forest Plan (1987), Selway-Bitterroot Wilderness General Management Direction outlines general direction for trails by stating they will be managed as a tool to protect the wilderness resource by managing the movement of people and stock. The primary emphasis is on resource protection, and the minimum tool principle will be applied to this end. As a minimum, I would suggest that natural forces (high stream flow in a ford) allowed to run their natural course, making travel impractical on a trail outside the “normal use season” and forcing users to wait for lower flows and potentially drier trail conditions is appropriate. However, Tin Cup trail and dam are located in Opportunity Class 4. The General Management Direction states that trails offer a low level of challenge, are well-defined and maintained. In O.C. 4 areas, all trail structures are acceptable except metal or plastic culverts. A bridge would reduce the level of challenge at this ford during high water but that type structure could be acceptable as long as it was the minimum needed for resource protection.

Trails

Environmental Consequences/Impacts of Alternatives

Alternative 1: No Action

Direct/Indirect Effects

Use of Trail 96 is expected to remain similar to existing condition: light spring use; heaviest during summer months. Users would experience a low level of challenge between trailhead and first ford. Beyond that point, they would experience trip delays and higher levels of challenge related to naturally occurring processes (high water in fords). The condition of Trail 96 is expected to follow existing patterns pending extraordinary, environmental events (snow slides, flood, fire-related wind events). Normal trail wear and tear would continue without increased use during wet, spring conditions. Minimal requirements direction may be followed more strictly by not constructing a second ford or bridge.

Cumulative Effects

The trail class and maintenance schedule for Trail 96 is not expected to change in the future. Over time, additional reconstruction work will be required to repair failing structures and additional deficiencies from normal use. Generally, adequate access to Tin Cup dam would be maintained but at times may not be responsive to TCCWSD immediate needs due to environmental events (wind, snowslides, flood, etc).

Alternative 2: New stream crossing**Direct/Indirect Effects**

Use of Trail 96 would not be expected to differ significantly from Alternative 1. The new stream crossing (ford) location would be subject to high water periods, similar to the existing ford. Potentially it would be unusable at times, like the existing site. Light spring use would continue with heaviest concentrations during the summer. Users would experience the same low level of challenge up to the ford. Beyond that point, they would experience trip delays and higher levels of challenge related to naturally occurring processes (high water in fords). A downed log lays just upstream of the current ford site. Currently, hikers use it to cross Tin Cup Creek. That use is expected to continue if a new stream crossing is built. Access to both crossings will be needed. The condition of Trail 96 is expected to follow existing patterns pending extraordinary, environmental events (snow slides, flood, fire-related wind events). Normal trail wear and tear would continue without significantly increased use during spring conditions. If the number of trips TCCWSD make during spring is minimized, then trail damage would not be expected to vary dramatically. Minimal requirements direction may not be followed strictly as a second ford and the access trail to each approach would be more intrusive than Alternative 1, 3 or 5. The planned location for this second ford is not advisable if Trail Management Handbook direction is followed. It places the trail below past high water levels and so portions could be subject to flooding during high water events. Cost estimates run high: \$40-50,000. It utilizes poorly drained soils which will require multiple fills and drainage structures as it crosses voids, organic hummocks, and high water channels. Normal trail wear and tear would be expected to continue without significantly increased use above the first crossing in spring.

Cumulative Effects

See Cumulative Effects, Alternative 1. There is no guarantee that this alternative will provide a more usable stream crossing during high water than the existing ford. There is potential for trail users to prefer using the existing ford site and downed log to cross Tin Cup Creek. Since most travelers use the existing crossing during normal use periods, this alternative could be interpreted as not following minimal requirements principles in wilderness. There is potential for the new section of trail and ford to make future budgetary demands on the Forest's trail budget due to flood loss.

Alternative 3: Proposed Action**Direct/Indirect Effects**

Use of Trail 96 would not be expected to differ significantly from Alternative 1. Light spring use is expected to continue with heaviest concentrations during the summer. Users would experience the same low level of challenge up to the ford. Beyond that point, they would experience higher levels of challenge related to existing creek crossings. Trip delays related to natural processes would continue. Users would hear helicopters if they were on the trail but effects could be minimized with flights timed for when fewer users are present. The condition of Trail 96 is expected to follow existing patterns pending extraordinary, environmental events (snow slides, flood, fire-related wind events). Normal trail wear and tear would continue without increased use during wet, spring conditions. Minimal requirements direction may better be followed by not constructing a second ford or bridge.

Cumulative Effects

See “Cumulative Effects, Alternative 1.

Alternative 4: Construction of bridge at first stream crossing**Direct/Indirect Effects**

Use of Trail 96 could increase more significantly from bridge construction than in any other alternative. Trip delays related to natural processes would end at this stream crossing. Spring use could increase but heavier use during summer would be expected to continue. A bridge available for crossing Tin Cup Creek would produce the lowest level of challenge at the first ford of any other alternative. Users would experience a low level of challenge up to the crossing and on to the next ford. Trip delays and higher levels of challenge related to creek crossings would move up the drainage three miles to the second Tin Cup Creek crossing. During high water this ford has been a natural force that delays traffic until the “normal use season” (approximately late June). The condition of Trail 96 above the bridge could change significantly with increased spring use. Effects to a trail tread used in typically, wet conditions can be damaging. Extent of damage can be related to quantity and type of use; often more pronounced in wilderness with stock use. Specific damages can include: tread surface damage when soft and/or saturated; drainage structures filled with mud and ineffective; tread widening at low, poorly drained sites; and potential for more “go around” routes at downed trees. Increased water running in trail tread from early season use coupled with the loosened soil from stock use could increase erosion on grades. Minimal requirements direction may not be followed strictly with bridge construction. A low level of challenge and structures are appropriate in Selway-Bitterroot Opportunity Class 4 areas. However, the structure is not required during the “main season of use”. The site would require a long bridge (estimated 60 feet) with railings and access trail constructed to each approach. Estimated cost would be \$90,000 to \$125,000. The existing ford site would continue to be present near the bridge site. The bridge structure and site manipulation required to install the bridge and access it could be perceived as more intrusive than proposed actions in Alternatives 1, 3 and 5.

Cumulative Effects

See Cumulative Effects, Alternative 1. As stated above, bridge construction could increase use and user impacts above the first ford. In fact, this alternative could change the “normal use season” on a portion of Trail 96, over time. Spring use of trails can be detrimental and damages usually correspond to numbers and types of users. After high water, conditions are drier and damages not as pronounced. Potential trail damages from spring use, bridge maintenance and reconstruction costs could put increased budgetary demands on the Forest’s trail budget, potentially displacing other trail priorities in the future. Mitigation that might reduce trail damage could include travel restrictions limiting use during wet, spring conditions. This alternative could more significantly affect public perceptions of wilderness management principles than any other Alternative.

Alternative 5: Close the headgate in fall**Direct/Indirect Effects**

See Direct/Indirect Effects, Alternative 1.

Cumulative Effects

If the dam failed, a high water event could lead to trail tread loss. Some trail segments that follow the creek channel closely could be washed out, ford approaches could be eliminated and ford structures lost. This action could force long-term trail closure, costly trail reconstruction/relocation projects and change the focus of the Forest’s trail priorities. These demands would then compete with and potentially reduce trail repairs done on other Ranger Districts. The potential for increased helicopter flights for dam reconstruction would be intrusive on trail visitors but if timed well might have little effect on users. Long-term loss of access on Trail 96 could redirect use and increase demands on other wilderness trails. Increased use coupled with potential damage from that use could force trail repairs that would not be needed otherwise.

Water Resources/Fisheries**Affected Environment****Introduction**

This section details aquatic resources that could potentially be affected by the Tin Cup Lake access project. The existing and desired resource conditions are discussed.

Physical Description and Existing Condition

Tin Cup, Little Tin Cup, and Spoon Creek are all within 6th-level watershed 170102050803, which includes 27,073 acres of National Forest and private lands. A large proportion of this watershed is within the Selway-Bitterroot Wilderness. It connects with the Bitterroot River near Darby, Montana. The boundary for the Tin Cup Creek 6th-level HUC watershed defines the analysis area.

GIS analysis suggests there are approximately 22 miles of stream channel and less than 2 miles of irrigation ditches within the Forest Service portion of the watershed, broken into classes as follows:

dry	ephemeral	intermittent	Perennial – non-fish bearing	Fish-bearing - perennial	Irrigation ditch	No data
5.2	0.7	4.7	5.7	11	<2	0.3?

Stream surveys from summer 2005 came up with the following results:

Stream	%< 2mm	%< 6mm	RSI	P-R channel stability	comments
Little Tin Cup Creek	3	4	15	Good	Extreme high energy stream, boulder/cobble bed.
Tin Cup Creek	5	5	65	Good	High energy, with very durable bedrock/boulder/cobble channel.
Spoon Creek	24	32	64	Poor	Cobble/sand bed, medium energy. RSI suggests bed mobility within values for reference (<80), but fine sediment % is high. Better stability higher in watershed, some deposition below.

Riffle Stability Index (“RSI”, Kappaesser 2002) values on the three streams all fall within the range of reference, unmanaged streams, but percentages of sediment <2mm and <6mm are above reference levels for the Bitterroot National Forest for Spoon Creek.

The channel in Tin Cup Creek shows no effects from the 1998 emergency rehabilitation of the dam at Tin Cup Lake, or the subsequent repairs in 2003. The rehabilitation work in 1998 released fine sediments into the channel, but the high transport capacity of the stream has dispersed them throughout the system and no unusual deposits or bars were seen anywhere in the stream channel. Percentages for fine sediment are within reference levels. Operational controls for the reconstruction activities limited fine sediments to minimal amounts, and few cumulative effects are expected within the 6th-level watershed. The amount of sediment that was transported to the Bitterroot River is unknown, but it is likely the rehabilitation work did contribute some fine sediment to this 303(d) listed waterbody.

Most precipitation in the watershed occurs as snowfall between October and April. Summer months bring cool to moderately warm, dry weather and occasional rainfall. Snow depths in the upper basin can reach as high as 20 feet, but 5 to 10 feet is more typical around the reservoir. Average annual precipitation is about 70 inches at the reservoir and ranges up to about 100 inches at the upper watershed.

Flows in upper Tin Cup Creek tributaries follow typical snowmelt patterns. High flows occur during the snowmelt peak in May and June, and recede to low flows in late summer and fall. Low flow is maintained throughout the winter until the following spring melt. Reservoir management affects flow in the stream reaches for several miles below the dam. The retention of snowmelt water in the reservoir, starting at the end of the spring melt, lowers peak flows in June and early July. Release of water beginning in August increases the baseflow level until the reservoirs are drained, usually in late September or early October. Lower in the canyon, drainage area that is not controlled by the dams dominates the flow regime, and less reservoir effect is seen. There is no active stream flow gage on Tin Cup Creek, although there is a flume immediately below the reservoir outlet.

Tin Cup Creek is typical of streams flowing east out of the Bitterroot Mountains. On National Forest Lands, its channel is a steep, boulder/cobble type with little fine sediment. The banks are well armored with more large rock and thick vegetation appropriate for the spruce-fir, and then Douglas fir/pine forest type through which it flows. The channel is generally well confined by rocky banks and old-growth forest in the wilderness, and is similar in the managed area although most big trees were cut decades ago. Watershed geomorphic integrity in this canyon was rated as “moderate”, mainly due to the influence of the dam. The watershed has mainly granitic geology and displays typical glacial effects of a u-shaped canyon and glacial outwash fans at the canyon mouth. The upper reaches (on National Forest) can be expected to transport water and sediment efficiently, with little impact to stream banks or channel bed. Lower reaches within the fans are somewhat more sensitive to high flow events, but no channel adjustments have been noted in this area. Irrigation diversion near the Forest boundary de-waters the creek and results in the listing below:

MTDEQ 2002 303(d) Listing for Tin Cup Creek:

Waterbody #	USGS 6th level HUC in project	Est. size (miles)	Beneficial Use, Partial Support	Probable Cause	Probable Source	Predicted TMDL completion date
MT76H004_080	1702050803	7	Primary contact recreation	Flow alteration	Agriculture	2011

The diversions chronically dewater about 2 miles of channel during mid- and late summer. While the State Impaired Waters Database lists a TMDL completion date by 2011, this process will not affect the diversions and the dewatering will continue as long as the water rights holders wish to utilize this resource. The listed stream reach that is

affected by this diversion is exaggerated, as the diversion does not occur the 7-8 miles upstream noted in the listing. The stream is hydrologically connected to the Bitterroot River during part of the spring high flow period, when flow volume is high and serious irrigation diversion has yet to begin. This hydrologic connection varies in duration annually, depending on snowpack and spring weather.

The downstream waterbody that receives flow from the analysis area is listed on Montana's impaired waters list. The Bitterroot River is listed as detailed in the table below:

MTDEQ 2002 303(d) Listing for Bitterroot River:

Waterbody #	Name	USGS 6 th level HUC in project	Est. size (miles)	Beneficial Use, Partial Support	Probable Cause	Probable Source	Predicted TMDL completion date
MT76H001_010	Bitterroot River (E & W Fk confluence to Skalkaho)	1702050805	24.3	Aquatic life support, cold water fishery (trout)	Other habitat alterations	Agriculture, grazing related sources, habitat modification, bank or shoreline modification/destabilization	2011

Land uses in the 6th-level watershed are quite varied. A large portion of the watershed is located on the Bitterroot National Forest and is within the Selway-Bitterroot Wilderness area. The remainder of the USFS-managed land in the watershed is outside the wilderness, and has experienced varied levels of management. On-Forest management in the Tin Cup Creek sub-watershed has been mixed, with a large portion of roadless/wilderness being protected from most management activities and a lower portion that has experienced road building and timber harvest. A relatively recent project-level analysis included the Tin Cup watershed. Fern Creek Environmental Assessment (USDA 1996) analyzed all USFS watershed area from Tin Cup to Waddell Creeks. Maps and fieldwork were used to characterize the physical condition of watersheds and the potential response to proposed activities. The table below summarizes the risk of streams reacting negatively to additional management proposed in the Fern Creek assessment.

Stream	Source: Risk, comments
Spoon Creek	Fern EA: Mod risk
Tin Cup Creek	Fern EA: Low Risk

This past analysis suggests good stream health and channel stability in the main channel of Tin Cup Creeks. In the Fern Creek assessment, watersheds were given several different risk ratings to characterize the various degrees of stream and watershed health observed in field surveys. Tin Cup and Little Tin Cup were rated as healthy; Spoon Creek was rated as sensitive. Spoon Creek was given its sensitive rating due to a high percentage of clayey soils and the potential for soil impacts from prior management. The

1991 Bitterroot National Forest Sensitive Watershed Analysis is noted as a major source of information. The Fern EA proposed and implemented a project to rehabilitate several Tin Cup Creek dispersed recreation sites to control streambank and riparian disturbance. Boulders were used to increase vegetated buffers between the campsites and the creek.

Forest management activities in the watershed have been minor for the last 2 decades. Approximately 673 acres have been harvested or treated, with about 284 of those being clearcut in the 1980s. With regeneration, this has resulted in approximately 1% of the 6th level watershed being in an equivalent clearcut area (ECA) condition. This is well below the 20 – 25% commonly used as a water yield cumulative effects threshold for this type of stream. During the last 25 years, only partial cut harvest treatments have been used, except for landings and temporary roads. No new road crossings have been built in the last 15 years, and several crossings have been removed (see watershed improvement activities, below).

Off the Bitterroot National Forest, land uses include agriculture, silviculture, ranching, recreation (motorized and non-motorized), and residential development. These uses have not been quantified for their impacts to the stream channel. Montana state regulations exist to limit stream channel impacts from several of these uses, but many of these past activities have contributed to the MT DEQ 303(d) listing of the main Bitterroot River (see listing, above).

Wetlands

Jurisdictional wetlands within the Tin Cup Creek watershed are limited. Most are linear features along the margins of the stream channel. Flood-prone areas along the stream, seeps, and springs are the main locations for riparian species within the canyon. Some water-loving or wetland species have utilized habitats made available by the construction and operation of the reservoirs. These areas are generally limited to seepage areas along the dam front. It can also be argued that use of the water impounded in these reservoirs creates some downstream riparian areas through agricultural irrigation.

Wilderness designation has maintained wetlands on the National Forest portion of the watershed in very good to excellent condition. Off-Forest, wetland condition is difficult to summarize. This is due to wetland losses from grazing, irrigation diversions, channelization, and hardening of stream banks, contrasting with increases in wetlands from flood irrigation.

Fisheries and Fish Habitat Variables

Cutthroat trout are present in Tin Cup Creek from the Bitterroot River confluence to the headwaters upstream of Tin Cup Reservoir. Cutthroat trout are also present within Tin Cup Reservoir, and in the lower mile of an unnamed second-order tributary draining Kerlee Lake; approximately 3 miles downstream of Tin Cup Reservoir. Upstream of the Kerlee Lake Tributary there is a steep section of stream. The geology creates a barrier to upstream fish movement. Cutthroat trout upstream of the geologic barriers are possibly

the progeny of westslope cutthroat trout (*Oncorhynchus clarki lewisi*) and Yellowstone cutthroat trout (*O. c. bouvieri*). Westslope cutthroat trout may have historically existed above the falls or both sub-species may have been stocked in Tin Cup Reservoir. Genetic testing of cutthroat trout from Tin Cup Creek has determined that the cutthroat population has been hybridized. Suitable spawning habitat is available for the lake-dwelling cutthroat trout.

The geologic barrier confines the upper distribution of bull trout in Tin Cup Creek. Bull trout inhabit approximately 10 miles of stream below this point. Although present, bull trout are rare between the National Forest boundary and Selway-Bitterroot Wilderness boundary, and more abundant but still uncommon between the wilderness boundary and the barrier falls. Young-of-the-year, juvenile, and adult bull trout (up to 20" in length) were observed during snorkel surveys on the late 1990s. Bull trout in Tin Cup Creek probably consist of resident life history fish (adult fish that spend their entire life in the Creek). It is rare that bull trout as large as 20 inches exist as resident fish in the Bitterroot's tributaries, but in Tin Cup Creek a few larger spawning adults (15-20") were observed. These fish were considered to be large residents and not adult fish migrating from the Bitterroot River. Tin Cup Creek is significantly dewatered on private land during the irrigation season, so it is unlikely that migratory bull trout from the Bitterroot River could access the Forest's sections of Tin Cup Creek during the September-October spawning period (Jakober 1998).

Brook trout exist with bull trout between private land and the vicinity of the wilderness boundary. In this 3-mile reach, brook trout are common-to-abundant, and outnumber bull trout by at least 5 to 1. Bull trout-brook trout hybrids are present at low densities in this section. Brown trout and rainbow trout are also non-native trout competitors, and are common in lower Tin Cup Creek.

Four interim objectives in the Inland Native Fish Strategy (INFISH 1995) apply to Tin Cup Creek: (1) pool frequency, (2) large wood [debris](LWD) frequency; (3) mean-maximum water temperature; and (4) wetted width-depth ratio. For this project, the interim Riparian Habitat Conservation Area (RHCA) widths listed in the INFISH Decision Notice would be applied.

Pool frequency refers to the number of pools occurring in a given length of stream. Pools are the key Riparian Management Objectives, (RMO) in the INFISH strategy, because of their importance as a habitat component. Pools are the habitats where trout spend most of their lives. Generally, the larger, deeper, and more complex pools have the greater value to fish. The interim RMO standard for pool frequency varies by wetted width of the stream channel. Tin Cup Creek currently meets the RMO for pool frequency.

Large wood frequency refers to the number of pieces of large wood occurring in a given length of stream. Large wood is a critical component of good fish habitat. It forms pools, provides cover, stabilizes stream channels, traps sediment and organic material, and provides food and habitat for aquatic insects. LWD is abundant in Tin Cup Creek and the stream exceeds the interim objective for LWD frequency.

Mean-Maximum Water Temperature refers to the mean of the maximum water temperatures recorded over the warmest 7-day period of the year. The interim RMO standard is mean-maximum water temperatures < 15 C (59 F) within adult holding habitat and < 10 C (48 F) within spawning and rearing habitat. Because spawning occurs when temperatures are generally low, this threshold is less likely to be exceeded; and the 15 C threshold was used for this analysis. Water temperatures in Tin Cup Creek were continuously monitored at the canyon mouth over four summers in the 1990's (Jakober 1998). Tin Cup Creek met the RMO for mean-maximum water temperature during average air temperature and colder-than-average air temperature summers, but has not met the RMO during warmer-than-average summers.

The width-to-depth ratio is the relationship of a stream's mean wetted width to its mean depth. Streams that have been impacted by management activities generally respond by becoming wider and shallower over time (resulting in higher width-depth ratios). Narrow, deeper channels (lower width-depth ratios) typically provide better trout habitat. The interim RMO standard for width-depth ratio is a ratio < 10 (mean wetted width/mean depth). Tin Cup Creek does not currently meet the interim RMO for width-depth ratio. However, the ratio observed at Tin Cup Creek is consistent with those measured in unmanaged watersheds (Overton et. al, 1995).

Regulatory Framework

The Bitterroot National Forest Plan (USDA 1987) provides direction to protect and manage resources. Only direction pertaining to the water resources portion of the project is included here.

The Forest Plan forest-wide goal for soil and water resources is to:

- Maintain soil productivity, water quality, and water quantity (p. II-3).

Forest –wide Management Objectives state how resources will be managed under the Forest Plan:

- Manage riparian areas to prevent adverse effects on channel stability and fish habitat (p. II- 6).

Forest-wide Management Resource Standards provide further detail:

- Utilize equivalent road area or similar concept to evaluate cumulative effects of projects involving significant vegetation removal, prior to including them on implementation schedules. (p. II-23)
- Maintain the percentage of “hydrologically unrecovered” area permitted in a landscape within the guidelines of Table II-5 of the Forest Plan. (p. II-24)
- As part of project planning, site-specific water quality effects will be evaluated and control measures designed to ensure that the project would meet Forest water quality goals; projects that will not meet State water quality standards will be redesigned, rescheduled, or dropped. (p. II-24)
- Soil and water conservation practices will be a part of project design and implementation to ensure soil and water resource protection. (p. II-25)
- Actively reduce sediment from existing roads. Sediment reduction measures to be considered include:

Cross-drains into vegetative filter strips away from streams,
 Grass seed, fertilized, mulch and netting on cuts and fills,
 Slash filter windrows or straw bales at toe of fill in contributing areas; and

- Gravel ditches and road surfaces (p. II-25)

The Inland Native Fish Strategy (INFISH 1995) amended the Forest Plan adding standards and guidelines related to aquatic and riparian habitat management. It also set standard widths for Riparian Habitat Conservation Areas (RHCAs). Within RHCAs, riparian-dependent resources, such as native fish habitat, receive primary emphasis. This project is within the Tin Cup Creek RHCA. The INFISH Standards and guidelines most relevant to this project include:

- RF-6: Construct new, and improve existing, culverts, bridges and other stream crossings to accommodate a 100-year flood....
- RM-1: Design, construct, and operate recreation facilities including trails and dispersed sites, in a manner that does not retard or prevent attainment of the Riparian Management Objectives and avoids adverse effects on inland native fish....
- RA-4: Prohibit storage of fuels and other toxicants, and other chemicals within Riparian Habitat Conservation Areas. Prohibit refueling in RHCAs unless there are no other alternatives. Refueling sites in the RHCA must be approved by the FS and have an approved spill containment plan.

The following Management Areas have further Management Goals and Management Standards that pertain to water resources. (Forest-wide Goals and Standards apply to all.)
 MA1, 2, 3a, 3c, 8a:

Management Standards:

- Utilize watershed rehabilitation projects such as stabilizing road cut or fill slope slumps to repair problems. (pp. III-6, 12, 18, 33, 59)

MA3b: Additional Management Area Goals:

- Manage riparian areas to maintain flora, fauna, water quality and water-related recreation activities. Emphasize water and soil protection. Roving in riparian areas will be restricted to meet water quality and fish objectives. (p. III-22)

Management Standards:

- Utilize watershed rehabilitation projects such as stabilizing road cut or fill slope slumps to repair problems. (p. III-27)

MA5: Management Standards:

- Management activities will be designed to protect the municipal watershed.
- Trail improvement or construction will be implemented with emphasis on soil stability and stream protection. (p. III-40)

MA8b: Management Standards:

- Habitat improvement practices will be designed to minimize or eliminate degradation of soil and water resources. (p. III-62)

Other regulatory or legal requirements that direct watershed management are:

- Clean Water Act, Sections 303, 319, 404
- Section 303(d) directs states to list water quality impaired streams (WQLS) and develop total daily maximum loads to control the non-point source pollutant causing loss of beneficial uses. Up until late March 2001, agencies were instructed to use the 1996 Montana 303d list of Water Quality Impaired Streams. The Environmental Protection Agency (EPA) approved the 2000 Montana 303d list in late March 2001. Because the 2000 list was approved late in this analysis, and a 2000 court order to the state to complete TMDL's (water quality standards and restoration plans) for all streams on the 1996 list, both lists are referenced in this report. TMDLs have not yet been developed for Bitterroot National Forest streams. Section 319 directs states to develop programs to control non-point source pollution, and includes federal funding of assessment, planning and implementation phases. At this time, no known Section 319 projects would be detrimentally affected by project activities. Section 404 controls the dredge and fill of material in waterbodies of the U.S.; proposed trail construction activities for Tin Cup Creek (ford construction option) appear to need this federal permit.
- ARM 16.20.603 – Best management practices (BMPs) are the foundation of water quality standards for the State of Montana. The Forest Service has agreed to follow BMPs in a Memorandum of Understanding with the State of Montana. Many BMPs are applied directly as mitigations for this proposal. Implementation and effectiveness monitoring for BMPs would be routinely conducted by contract administrators, and during other implementation and annual monitoring events.
- ARM 17.30 Sub-chapter 6 details water quality standards for the State of Montana. The USFS has primary responsibility to maintain these standards on lands under their jurisdiction in the State of Montana.

Designated Beneficial Uses of Local Waters

The Montana Department of Environmental Quality has given all National Forest waters its B-1 classification (ARM 16.20.604). The associated beneficial uses of B-1 waters are drinking, culinary and food processing purposes (after conventional treatment); bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

Water quality is currently maintained and improved through the application of Best Management Practices (BMPs) for controlling nonpoint sources of pollution to surface water. Use of BMPs is the foundation of water quality standards for the State of Montana. This is documented in ARM 16.20.603 and means "land and management activities must not generate pollutants in excess of those that are naturally occurring, regardless of the stream's classification". Naturally occurring as defined by ARM, is the water quality condition resulting from runoff or percolation over which man has no control or from developed lands where all 'reasonable' land, soil and where conservation practices (commonly called BMPs) have been applied. Effectiveness of these measures is rated through the State of Montana BMP audit process every other year on a mix of land ownerships where timber harvest has occurred. The results of these audits are published annually by the Department of Natural Resources and Conservation. In 2000,

on Federal lands BMP application was rated as 96 percent compliant, and 97 percent effective.

The proposed action has the potential to affect the physical and biological quality of the waters within the project area. The associated water quality criteria that could be affected are:

2. No person may violate the following specific water quality standards for water classified B-1:
 - (d) The maximum allowable increase above naturally occurring turbidity is 5 nephelometric turbidity units except as permitted in ARM 16.20.633.
 - (e) A 1 degree F maximum increase above naturally occurring water temperature is allowed within the range of 32 to 66 degrees F;
 - (f) No increases are allowed above naturally occurring concentrations of sediment...which are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish or other wildlife (ARM 16.20.633).

Desired Condition and Regulatory Consistency

The desired condition for water resources is stated above in the Regulatory Framework section. The implied goal is to meet all regulatory standards for water quality pertinent to the Montana DEQ B-1 classification. Conditions in the Tin Cup Creek watershed on Forest Service lands currently meet all pertinent regulatory direction. Water resources are currently meeting the goals stated in the 1987 Bitterroot National Forest Plan (listed above). Water quality within the Selway-Bitterroot Wilderness Area presently supports all State-assigned beneficial uses, but cold-water fishery and primary contact recreation are only partially supported below irrigation diversions which almost fully de-water the stream in the summer and fall.

Summary

Water resource and watershed conditions in the Bitterroot National Forest portion of the Tin Cup Creek watershed are considered very good, with the exception of Spoon Creek, which is considered fair. The designated wilderness status of the upper watershed has protected water resources from most human impacts. While Spoon Creek surveys suggest fine sediment in excess of reference levels, there is little connected disturbed area and few road crossings in this sub-watershed to trace sediment back to. In Tin Cup, the main human effect has been the dewatering of the lower reaches during irrigation season, which has caused the State to include the stream on its CWA S303(d) list. Tin Cup Dam does affect stream flows for an undetermined distance downstream of its location, but the small percentage of watershed area it controls and the timing of releases minimize downstream impacts. On the negative side, irrigation diversions and varied land uses in the private land portion of the watershed has detrimentally impacted water quality and fish habitat.

Water Resources and Fisheries Consequences of Alternatives

Introduction

This section describes potential water resource effects from the various alternatives for the Tin Cup Lake Access Project. Also please see the Biological Assessment/Evaluation (BA/BE) for Fisheries for more information (PF K-02).

Tin Cup County Water and /or Sewer District, (TCCWSD) has requested access changes to improve their ability to manage their reservoir, and improve safety. There are five alternatives assessed for potential effects. These alternatives are described in detail in Chapter 2, but can be summarized:

Alternative 1 is the required no-action alternative, which results in the TCCW&SD continuing on their current process of using the existing route and ford, or submitting an annual request for helicopter access into the wilderness.

Alternative 2 would re-route the trail and build a ford across Tin Cup Creek.

Alternative 3 (the Proposed Action) would authorize one or two helicopter trips per year on a long-term basis.

Alternative 4 would result in the construction of a stock bridge over Tin Cup Creek near the location of the present ford.

Alternative 5 would require TCCWSD to close their headgate in the fall when still accessible by stock or foot, and thereby relieve the need to create special access provisions or structures.

Issues arising from Analysis

Certain issues became apparent during internal and external scoping. Most were related to aesthetics and wilderness access. These issues are discussed in detail in the wilderness resource report for this analysis. Water resource impacts were not considered a key issue because they were not supported as such in public comments and the analysis suggests implementation of any of the alternatives would not affect water resources as long as appropriate mitigations were required for any construction. However, water resource and fisheries effects and mitigation discussion is included to inform the decision maker and for general public interest.

Since water resource and fishery issues were not determined to be key issues, no alternatives were designed to specifically address water resource concerns. Rather, mitigation measures and operational controls of the Forest Service and other agencies (e.g., Montana Department of Natural Resource Conservation, U.S. Army Corp of Engineers) were determined to be sufficient to limit aquatic impacts of the action alternative.

Water rights are controlled by the State of Montana. The water storage and flow control aspects of Tin Cup Lake or other diversion systems are beyond the scope of this analysis and decision.

Required Permits

Depending on the final design, Alternative 2 or 4 may require:

- CWA s404 permit for dredge and fill in waterbodies of US from the US Army Corp of Engineers (mandatory),
- 310 permit (Montana Natural Streambed and Land Preservation Act) for operations near a stream or wetland, from local Conservation District (mandatory, 128 permit if agency-led),
- 318 authorization for unavoidable short-term water quality violation of turbidity standard, from MTDEQ (Highly recommended),

All permit application work is the responsibility of the TCCW&SD as project proponent.

Sensitive Areas

Very few areas in the Tin Cup Creek watershed were determined to be especially sensitive to the proposed activities. The Affected Environment – Water Resources/Fisheries section describes the wilderness nature of the streams and wetlands, and with the exception of the dam, how little management has occurred. Stream channels are very durable cobble and boulder types, with dense riparian vegetation and the ability to handle high energy flows. Spoon Creek may be considered sensitive to sediment increases, but no activities from this project would occur in that sub-watershed.

The Bitterroot River is downstream of the proposed activities, and is currently on the MT DEQ 303(d) list for several reasons, including sediment/siltation (please see affected environment section for details). This river would be sensitive to net increases in chronic (long-term) sediment loading in its tributaries.

Affected Area

The aquatic resources that may be affected by the alternatives are those immediately downstream of the ford. While the channel itself is very rocky and durable, riparian vegetation and soils on either side of the new bridge (Alt 4) or ford (Alt 2) would be slightly impacted. This area of potential disturbance is very small area and few off-site impacts are expected. The table below illustrates the potential ground disturbance for the two alternatives that could include construction activities:

Alternative; activity	Disturbed area length	Disturbed area width	Total area disturbed
Alt 2 – new trail & ford	1000' trail	4' trail width	4,000 sq ft (0.1 ac)
Alt 4 - bridge	(2) 10'x10' bridge abutment construction, 250' new trail	4' trail width	1,200 sq ft (0.03 ac)

Only a portion of each of these potential disturbances would be adjacent to the stream or within its narrow riparian area and similar size areas would be rehabilitated if new trails are built. Overall there would be no net gain in connected disturbed area. Alternative 2 would also create a small disturbance in the stream channel if channel materials must be

moved to create a useable ford. Initial surveys located a site needing very little, if any, instream work.

Mitigation Measures

Mitigation measures are those controls or guidelines that allow activities to proceed with minimized environmental impacts. Chapter 2 in the EIS lists all the mitigation measures proposed for the action alternative. These required measures are designed to eliminate or minimize water resource effects from erosion, sedimentation, human waste, fuel handling and fuel storage. The Consequences of Alternatives discussion (below) is based on implementation using the following mitigation measures.

Consequences of Alternatives

Direct and Indirect Effects Common to Alternatives 1, 3, and 5

These three alternatives create approximately the same consequences (or effects) to the aquatic resource. None of the three propose any new ground disturbance or increased activity within the analysis area that has the potential to negatively affect water resources. Dam operation would continue on its current pattern. The negligible level of aquatic resource impacts that have been occurring in the recent past would continue, with stock being used to access the dam as needed. Trail impacts from the few trips needed by the dam operators would continue to be minor.

Helicopter access has been requested (and granted) several times in the past, and alternative 3 (authorize 1-2 helicopter trips annually) would not adversely increase the risk involved with flying over sensitive water resources. In other words, the risk of a helicopter loaded with fuel and lubricants crashing into the stream or reservoir would not change appreciably whether helicopter access was granted on a yearly or long-term basis. In any alternative, the risk of a helicopter crashing during this type of operation is considered low due to the limited number of trips, opportunity to postpone until acceptable weather occurs, and standard operating protocols for contract helicopters.

Dam safety protocols suggest that leaving the reservoir pool at a low level during the winter/early spring reduces the potential for ice and woody debris impacts to the upstream dam face, headgate, and spillway. Alternative 5 (close headgate in fall) would increase the probability for damage to these components and increase the duration that the channel and aquatic habitats below would be exposed to a full pool and its risks (please see Appendix D for full discussion). However, the maintenance and operations procedures for the dam include annual inspection of all components, and it is likely that any impacts to them would be detected before they became a substantial safety risk. There is, however, potential for increased maintenance or replacement of components such as the control structure or headgate with Alternative 5, which generally requires more disturbances and has related impacts to water resources.

Direct and Indirect Effects Common to Alternatives 2 and 4

Alternatives 2 (new stream crossing & trail segment) and 4 (build bridge) have several common characteristics and similar potential impacts. Both require minor disturbances

adjacent to the stream, to either anchor the bridge or begin trail construction and clearing. The discussion under “Affected Area” (above) details the amount of ground actually being disturbed. A stock bridge would utilize existing boulders for support and would not require channel encroachment. Construction work for either alternative would be limited to wilderness-acceptable methods; the limited use of mechanized equipment greatly reduces the potential disturbance at the sites.

Alternative 2 would result in minor new disturbances next to the stream. Trail construction generally consists of removing enough organic debris and duff to make a trail tread, moving obstacles and trimming brush or trees. The compacted and denuded surface creates surface flow during hydrologic events, which can produce minor sediment in nearby streams. Generally, the amount of hydrologically connected disturbed area from trails can be decreased to minimal amounts by proper construction. Cross-draining the trail just before it reaches the stream is among the most important sediment-reduction techniques. The Tin Cup area is also quite rocky, which adds to trail durability and reduces sediment and long-term downcutting. The initial survey for a better trail/ford location revealed rather flat streamside terrain, with about a 2' drop into the channel from the stream bank. The trail would traverse some poorly drained or boggy areas away from the stream that would require fill material. Overall, this terrain suggests proper trail construction would not be difficult, and that effects from a well built trail would be minor sediment contributions over the life of the trail. The sediment produced would not differ greatly in amount from a game crossing or uprooted streamside tree, and poses no threat to aquatics. Rehabilitating the former crossing would reduce net sediment gain to negligible amounts. This disturbance and clearing would be within the Riparian Habitat Conservation Area (RHCA), as dictated by the 1995 INFISH forest plan amendment. Due to the small amount of disturbance, no negative impacts are expected, and the project would not inhibit attainment of the INFISH Riparian Management Objectives (RMOs).

Alternative 4 would result in minor new disturbances next to the stream. Constructing bridge abutments may require moving some boulders to better support the ends of the bridge. The bridge design and materials have not yet been specified, but wilderness considerations and limits on mechanized equipment limits ground disturbance and excavation around the stream channel. The amount of ground disturbance is estimated at approximately 200 square feet, spread between both sides of the stream. Several trees may have to be felled for this alternative, but the small amount of clearing is unlikely to affect water temperatures in this wilderness watershed. This disturbance and clearing would be within the Riparian Habitat Conservation Area (RHCA), as dictated by the 1995 INFISH forest plan amendment. Due to the small amount of disturbance, no negative impacts are expected, and the project would not inhibit attainment of the INFISH Riparian Management Objectives (RMOs).

Wetlands

Alternatives 1, 3, and 5 would not threaten any existing wetlands, and would maintain the current trail and crossing footprint. Alternatives 2 and 4 could potentially eliminate wetlands on each side of the stream where the bridge or trail is located, and anywhere along the tread where fill is needed (up to a maximum of 0.1 acre, as estimated above in

the affected area section). Given the narrow nature of the trail, the overall loss of wetlands would be negligible. The proposed management would not threaten other wetlands elsewhere in the watershed due to the distances involved and the very minor on-site effects.

Floodplains

Tin Cup Creek has narrow and discontinuous flood plains typical of Bitterroot Mountain Range streams. Geologic processes of uplift and glaciation have acted to severely limit floodplain formation within the canyons, and therefore floodplain alteration by construction activities is a negligible risk. Floodplains adjacent to Tin Cup Creek are rarely more than a couple feet wide – the v-shaped inner gorge and boulder channel margins effectively keep the stream in the channel during most floods. Operational mitigations and necessary permits act to further limit floodplain impacts at the construction site (see mitigations, above). Some observable floodplain is present on public lands below the canyon mouth, but the potential for construction work many miles up the canyon to affect floodplain form or use in this location is very low.

None of the alternatives threatens floodplain function or structure. Those alternatives that utilize stock travel (1, 2, 4, and 5) would present the same small footprint on streamside floodplains, although moving the trail and constructing a new ford would shift the impact to a different location. A bridge would utilize existing streamside boulders for abutments and would not encroach upon the channel or narrow floodplain. The miniscule amount of floodplain area that would be affected would not create downstream effects.

Fisheries

The proposed activities in any of the five alternatives would be expected to have inconsequential effects on the fisheries, including cutthroat and bull trout. Alternatives 1, 3, and 5 would, at the most, have negligible risk of negatively impacting fisheries because their implementation would not result in new ground disturbance.

Implementation of alternative 1, 3, or 5 also would result in activities, like helicopter flights, that have extremely low risk of negatively affecting fisheries. Alternatives 2 (new stream crossing & trail segment) and 4 (new bridge) require minor disturbance adjacent to the stream. The limited use of mechanized equipment, the existing condition at the sites, and the relatively short segment of stream that would be affected greatly reduce the potential for negative effects to fisheries at the sites and downstream. These types of projects have recently been implemented on the Forest without measurably impacting fisheries (Bass Creek Bridge, Lick Creek Bridge, and Big Creek Trail improvements). In the long term implementing Alternatives 2 and 4 would result in disturbance equal to the existing condition because the old crossing and trail would be rehabilitated.

Cumulative Effects

Past Effects

The boundary for the Tin Cup Creek watershed defines the cumulative impacts analysis area. Due to the projects extremely small footprint and intensity of activity, its ability to affect water resources any distance downstream of the site is extremely limited.

The upper watershed is within the Selway-Bitterroot Wilderness and has experienced little human disturbance other than Tin Cup Dam construction, maintenance, and operation. The dam was constructed without modern motorized equipment. The effects of the original construction (mainly sediment from quarry sites and ground disturbance) have likely subsided to the point of non-existence, or were mitigated by storage in the reservoir pools. Reservoir and dam operations since that time have included the filling and draining of the pool, clearing of driftwood and occasional maintenance of the spillway and dam crest. Seasonal draining would change flow and sediment regimes somewhat from those existing before the dam. Flow regimes are discussed in the hydrology Existing Condition section. Dam operations tend to contribute little sediment to the stream due to the rocky nature and low sediment input from the contributing area above the dam. The reservoir also acts as a stilling pond and what natural sediment is carried into the reservoir is effectively stored in the inlet end of the waterbody.

In 1998, the Forest Service undertook emergency rehabilitation work of the Tin Cup Dam due to safety concerns. An excavator was used to cut a notch in the dam after the water level had been lowered with siphons and the headgate. Other mitigations were in place (sand trapping device, working from upstream face) but some sediment did enter the water column. An exact measurement is not available, but visual estimates were in the range of 2-3 cubic yards. Channel transects in 2000 found sediment deposits downstream of the dam were similar to pre-project conditions (Forest Plan Monitoring Report, 2000, pg 77).

Tin Cup Creek below the designated wilderness boundary has been identified as a water quality-limited stream on the MTDEQ 303(d) list, which suggests that beneficial uses have been affected. The listing is due to irrigation diversion and de-watering of the channel during summer and fall; Tin Cup Creek does not connect with the Bitterroot River the entire year. Field data suggests that the Tin Cup Creek stream system between the dam outlet and the lower diversion sites responsible for de-watering the channel is in stable, functioning condition. Housing development, road building, agriculture, channelization, and other rural and suburban activities have combined to degrade stream health below the Forest Service boundary. These activities will continue to provide increase sediment and reduce flow in the creek, although it is difficult to predict the extent of either impact.

Present Effects

Currently, Forest Service activities that could affect the local aquatic resources in the Tin Cup Creek watershed are minimal. Other than normal maintenance activities, no work is presently planned on trails or the trailhead area. Unauthorized ATV trails are occasionally found in open areas near the USFS/private boundary, but most are on dry ridges and benches and do not significantly effect water quality. Prescribed fire has been used in the vicinity but none have resulted in negative watershed effects. Wilderness activities are limited to camping, hiking, and stock use, none of which has been noticeably degrading stream or watershed health. Tin Cup Dam operations are likely to continue, but other than affecting the flow regimes, these activities are causing only

minor aquatic effects downstream. Diversions near the Forest Boundary will continue to dewater the channel and cause a hydrologic and biologic disconnection during irrigation season.

Potential Future Effects

Potential future disturbance in the watershed includes further work on the dam, trail maintenance or reconstruction, trailhead improvements, and hazardous fuel reduction projects near the Forest Service boundary. Most of these have the potential of contributing small amounts of sediment to Tin Cup Creek, but none have the potential for major effects either singly or in unison.

Hazardous fuel reduction projects below the wilderness may include manual and mechanical (heavy equipment) vegetation treatments, and prescribed fire. Mechanical treatments are generally excluded from riparian areas, although this may not always be the case. INFISH regulations allow timber harvest within the designated buffer zones as long as achievement of riparian and fish habitat management objectives is maintained or promoted. Prescribed fire may be allowed to burn in riparian areas, but direct lighting is limited by the INFISH regulations. Any impacts from prescribed fire or manual treatments would be minimal and extremely short-term; mechanical treatments have more potential for generating sediment and creating a slightly longer-term (2-3 years) impact. These potential activities would be subject to the appropriate NEPA process and specialist review and therefore are not considered a significant threat to water resources.

Current proposals in the area include those associated with the Trapper-Bunkhouse Project. Activities associated with this project include watershed improvements, vegetation treatments (both manual and mechanical), and prescribed fire. The area proposed for treatment within the Tin Cup 6th level watershed has yet to be determined, but will likely include some of each of the above treatments. Cumulative effects analysis for the Trapper-Bunkhouse project will consider any impacts that result from the Tin Cup Access project.

Cumulative Effects Summary

Overall, the cumulative effects on the USFS portion of the Tin Cup Creek watershed are insignificant for water resources. Once the stream leaves USFS lands, stream health declines due to a myriad of land-use activities. Otherwise, the trend from a rural to a suburban community will continue to affect stream health on private lands within the Tin Cup Creek watershed. Foreseeable Forest Service activities in the drainage would include all State and Federal regulation and pose little threat to water resources.

Forest Plan and Regulatory Consistency

All alternatives for the Tin Cup Lake Access 2006 project would be consistent with the 1987 Bitterroot Forest Plan Standards and Guidelines (listed in the Affected Environment – Water Resources section). All other pertinent regulations pertinent to water resources would also be met, as long as proper permitting processes are followed.

Summary

None of these alternatives is likely to cause an aquatics impact or degrade channel conditions. Net sediment would remain constant after a new crossing and trail is constructed as long as the old crossing and trail is rehabilitated, and therefore downstream sites would not be threatened by increased sediment.

Wildlife Resource**Affected Environment and Effects of the Alternatives****Regulatory Framework**

The two principle laws relevant to wildlife management are the National Forest Management Act of 1976 (NFMA) and the Endangered Species Act of 1973 (ESA). Regulations promulgated subsequent to passing NFMA require the Forest Service to manage fish and wildlife habitat to maintain viable populations of all native and desirable non-native wildlife species and conservation of listed Threatened or Endangered species populations (36CFR 219.19). Additional guidance is found in Forest Service Manual (FSM) Direction, which states; identify and prescribe measures to prevent adverse modifications or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened, and proposed species (FSM 2670.31 (6)). ESA requires Forests to manage for the recovery of threatened and endangered species and the ecosystems upon which they depend. Forests are required to consult with the Fish and Wildlife Service if a proposed activity may affect the population or habitat of a listed species.

The FSM also directs the Regional Forester to identify sensitive species for each National Forest where species viability may be a concern. Forests are then required to monitor sensitive species populations and prevent declines that might require listing under ESA (FSM 2670.32 (4)).

The principle policy document relevant to wildlife management is the Bitterroot Forest Plan of 1987. This document provides standards and guidelines for management of wildlife species and habitats on the Forest. The Record of Decision (1987) for this plan requires retention of 25 percent of the big game winter range in thermal cover. Other Forest Plan standards related to maintenance of wildlife populations include standards for amount and distribution of old growth habitat by management area, retention of snags, maintenance of elk populations and habitat, and management of elk habitat effectiveness through the Travel Planning process (USDA, Forest Service, 1987).

Analysis Area

The analysis area used for evaluation of effects to wildlife species is the entire Tin Cup Creek drainage west of the National Forest boundary. Wildlife species and habitat evaluated in this analysis include: Forest Plan management indicator species, Threatened, Endangered and Sensitive species listed for the Bitterroot National Forest, and species of special interest or with unique or limited habitat in the assessment area (mountain goat).

Affected Environment

The Tin Cup drainage provides habitat for wildlife species typically found in coniferous forests of western Montana. Wildlife habitat in the drainage includes riparian vegetation along Tin Cup Creek, large grassy or rocky openings with scattered ponderosa pine and Douglas-fir on many of the south facing slopes, and extensive areas of montane forest dominated by lodgepole pine, Douglas-fir and sub-alpine fir on the north aspects. With increased elevation, the forest transitions into whitebark pine. In addition to streamside riparian zones, portions of the drainage contain seeps and wallows that provide riparian vegetation associated with high water table areas. These wet areas are extremely important as microsites providing habitat for small mammals and birds as well as big game species.

Little management has occurred in forested habitats in the Tin Cup Creek drainage because the vast majority of the drainage is classified as Wilderness or roadless. Timber harvest has occurred in some areas near the mouth of the canyon, which is accessed by a road system. The Tin Cup Creek Trail that provides access to Tin Cup Lake begins at a trailhead on the highest road that crosses the creek, which is just below the canyon mouth.

Elk, mule deer, and white-tailed deer are resident in the area. Moose occur primarily in or near the creek bottoms and adjacent thickly vegetated north aspects. Mountain goats summer in the basins near the top of the drainage, and winter along the steep south-facing cliffs near the mouth of the canyon. Other resident species of interest include black bear, mountain lion, coyote, furbearers, and numerous birds and small mammals.

Threatened and Endangered Species

Reports of wolf sightings or wolf sign are fairly common in the Tin Cup Creek drainage and surrounding areas, and it seems likely that the area is within the established territory of a wolf pack. The pack that seems to occupy the area could be the Lake Como pack, which was discovered in upper Rock Creek in 2002. None of the members of this pack have been radio-collared, and there is no data available that would define territory boundaries. No den sites or rendezvous sites are known within the Tin Cup Creek drainage.

The upper Tin Cup Creek drainage contains suitable habitat for lynx, but there are no known reports of lynx sightings or sign in the drainage. The area in the vicinity of the first creek crossing is too low to be classified as lynx habitat.

Lower Tin Cup Creek may provide some marginal foraging habitat for bald eagles, but there are no known reports of eagles using the creek. There is no suitable nesting habitat in the vicinity of the dam. The closest known bald eagle nest is near Lake Como.

Sensitive Species

Peregrine falcons have nested on the cliffs in lower Tin Cup Creek canyon since at least 1999. These peregrines have successfully fledged young most years, including three young in 2005. Northern goshawks have been seen in the drainage, but no goshawk nests

have been located. Suitable flammulated owl habitat occurs on some of the south aspects in the lower part of the canyon that support mature and over-mature ponderosa pine stands. The creek bottom along Tin Cup Creek is suitable habitat for fisher, and fisher may use the area to some extent. The creek bottom is also suitable habitat for western toads, which may breed in ponds or backwaters of the creek. Tin Cup Creek or its tributaries may provide some suitable habitat for Coeur d'Alene salamanders. Habitat throughout the drainage is also suitable for wolverine, a habitat generalist that has a very large home range.

There is no high-quality habitat available for the other sensitive wildlife species on the BNF (see Biological Evaluation, PF K-07).

Management Indicator Species

The entire length of the creek bottom along Tin Cup Creek is suitable habitat for elk, pine marten and pileated woodpeckers. Marten habitat extends up the forested, north-facing slopes, while pileated woodpecker habitat includes parts of the lower slopes on either side of the creek. Elk use the entire drainage at various times of the year, except for the steeper, rocky areas.

Effects of the Alternatives

Direct and Indirect Effects

Alternative 1

This alternative would have negligible effects to any wildlife species on the BNF. Effects would be limited to very minor and temporary disturbance to individual animals that happened to be near the trail as TCCWSD staff rode or hiked by on their way to Tin Cup Lake Dam to close the control gate. No habitat for any wildlife species would be affected. TCCWSD would probably continue to request a permit to access the dam via helicopter in the spring. This request would be analyzed and a separate decision each year.

Alternative 2

Construction of a new stream crossing and re-routing of 1000 lineal feet of trail during the summer could result in minor and temporary disturbance to wildlife species that happened to be near these activities. Rerouting the trail would require felling some trees, as well as filling in some low, wet spots. These habitat changes could result in very minor reductions in habitat quality for pileated woodpeckers, western toads, fisher and marten. Such habitat alterations would be negligible at any scale larger than the immediate area around the construction site. Since populations of all the wildlife species that could be affected are quite mobile and are well distributed across the Forest, it is unlikely that these minor habitat changes would have any effect on population numbers or on population viability of any of these species. This alternative would have no effect to peregrine falcons or mountain goats because it does not include any helicopter flights.

Alternative 3

This alternative proposes one or two helicopter flights per year to access the dam in the spring. These flights would not affect habitat for any wildlife species.

This alternative could result in some disturbance to peregrine falcons nesting in the cliffs near the mouth of Tin Cup Creek. Helicopter flights up to the lake in the spring as proposed would occur during the beginning of the nesting period, when peregrines are most sensitive to disturbance. The Forest has permitted these types of flights in the spring the past several years, but has restricted the flight path to avoid close approach to the nesting cliffs. Our monitoring data shows that the peregrines nesting in Tin Cup Creek have successfully reproduced most years regardless of limited spring helicopter flights. A mitigation included in this decision would require helicopter flights during the peregrine falcon nesting season to stay as far south in Tin Cup canyon as safely possible to minimize disturbance to nesting falcons.

Helicopter flights to the dam could disturb individual animals of any species that happened to be in the vicinity of the dam when the helicopter landed. Wolverine can be particularly vulnerable to human disturbance in the winter around their den sites, which are sometimes found in high elevation talus slopes. Any such disturbance would be temporary, and would not have any lasting effects on individuals or on populations.

Helicopter flights to the dam could also potentially disturb mountain goats if the helicopter passed low over the goats, and especially if it hovered over them. Individual goats could be injured or killed by if they panicked and ran across rock faces. Mitigations requiring helicopter pilots to avoid goats would greatly reduce the chances of such disturbance.

Alternative 4

Construction of a new bridge and re-routing of 1000 lineal feet of trail during the summer could result in minor and temporary disturbance to wildlife species that happened to be near these activities. Rerouting the trail would require felling some trees, as well as filling in some low, wet spots. Construction of bridge footings would likely require a small amount of additional felling. These habitat changes could result in very minor reductions in habitat quality for pileated woodpeckers, western toads, fisher and marten. Such habitat alterations would be negligible at any scale larger than the immediate area around the construction site. Since populations of all the wildlife species that could be affected are quite mobile and are well distributed across the Forest, it is unlikely that these minor habitat changes would have any effect on population numbers or on population viability of any of these species. This alternative would have no effect to peregrine falcons or mountain goats because it does not include any helicopter flights.

Alternative 5

This alternative would have negligible effects to any wildlife species on the BNF. Effects would be limited to very minor and temporary disturbance to individual animals that happened to be near the trail as TCCWSD staff rode or hiked by on their way to Tin Cup Lake Dam to close the control gate. No habitat for any wildlife species would be affected.

This alternative would not affect peregrine falcons or mountain goats because it does not include any helicopter flights.

Cumulative Effects

The cumulative effects analysis area for all wildlife species is the Tin Cup Creek drainage. This scale is appropriate due to the limited and/or temporary nature of the potential direct and indirect effects, as well as the limited prior management effects in a drainage that is mostly Wilderness.

The existing condition reflects the sum of past activities. Major past activities in this area include: construction of the dam on Tin Cup Lake that led to changes in water flow regimes; construction of a road system on both private and public lands low in the drainage, and of the trail that climbs to the top of the drainage, both of which increased human access to the area; timber harvest near the mouth of the canyon and on the east-facing slopes on either side of the canyon mouth; subdivision on private land lower in the drainage; irrigation withdrawals that reduced flows in the lower parts of the stream; and the advent of successful fire suppression which resulted in more cover and less forage habitat than was present historically in the area. Timber harvest outside the Wilderness has reduced the effect of fire suppression to some extent by reducing cover and increasing forage habitat in harvest units.

Each of the alternatives would result in slightly different direct and indirect effects. The direct and indirect effects to any wildlife species under any of the alternatives are very minor and localized. These minor, local effects would add very little to the limited cumulative effects that have resulted from the previous management activities that have occurred in this largely Wilderness drainage.

The sum of the direct, indirect and cumulative effects of any of the alternatives would not affect the viability of any wildlife species at any scale.

Forest Plan Compliance

None of the alternatives include any timber management activities. Therefore, there is no Forest Plan direction to analyze elk habitat classifications in the Tin Cup Creek drainage. No changes to existing elk habitat ratios are anticipated as a result of this project.

All alternatives meet Forest Plan standards for elk habitat and elk habitat effectiveness (FP II-21) because none would change the existing condition. The Forest Plan Record of Decision requires retention of 25% thermal cover in elk winter range. All alternatives are consistent with this requirement since none would alter existing thermal cover percentages. None of the alternatives would change the existing elk habitat effectiveness percentage, which currently meets Forest Plan standards in all third-order drainages within the Tin Cup Creek watershed.

All alternatives meet Forest Plan standards for old growth habitat because there is no Forest Plan standard pertaining to old growth habitat in designated Wilderness.

All alternatives meet Forest Plan standards (FP II-19) for MIS wildlife species (pine marten and pileated woodpecker), since all retain existing old growth habitat.

The Forest Plan does not contain any goals, objectives or standards pertaining directly to mountain goats.

Threatened, Endangered and Sensitive Plant Species

Affected Environment

Introduction

An evaluation of threatened, endangered, and sensitive plant species for the Tin Cup Lake Access Project was conducted in order to determine species most likely to be affected by proposed activities. Plant surveys were conducted in 1992, 1994 and 1997 in conjunction with the Tin Cup Dam and Tin Cup Trail Reconstruction Projects and included surveying the dam and the trail leading into the dam. The Montana Natural Heritage Program database and Bitterroot National Forest records were also reviewed to identify known sensitive plant populations in or near the proposed project area. Aerial photographs were used to determine potential habitat for sensitive plant species in the project area. Based on this data, the following list was compiled of sensitive plant species that either were known to occur within the project area or had the potential to occur in the area:

Sandweed	<i>Athysanus pusillus</i>
Rocky Mountain paintbrush	<i>Castilleja covilleana</i>
Yellow lady's-slipper	<i>Cypripedium parviflorum</i>
Idaho douglasia (Idaho only)	<i>Douglasia idahoensis</i>
Evermann fleabane	<i>Erigeron evermannii</i>
Western boneset	<i>Eupatorium occidentale</i>
Discoïd goldenweed	<i>Haplopappus macronema</i> var. <i>macronema</i>
Western pearl-flower	<i>Heterocodon rariflorum</i>
Scalegpod	<i>Idahoa scapigera</i>
Bitterroot bladderpod	<i>Lesquerella humilis</i>
Old man's beard	<i>Nodobryoria subdivergens</i>
Storm saxifrage	<i>Saxifraga tempestiva</i>
California false hellebore	<i>Veratrum californicum</i>

Existing Condition

Species listed above that are found within ten miles of the project area include sandweed, scalegpod, Rocky Mountain paintbrush, Evermann fleabane, storm saxifrage, and western boneset. There are populations of Evermann fleabane on Bare and Trapper Peaks, a population of storm saxifrage on Boulder Peak, alpine populations of Rocky Mountain paintbrush on Watchtower Peak and in the headwaters of Soda Springs Creek, and western boneset was found on Mt. Jerusalem and in the Chaffin Creek drainage. Other nearby sensitive plant species include sandweed, scalegpod and western pearl-flower all

found on vernal moist ledges along the south-facing canyon walls of Tin Cup and Chaffin Creeks. Suitable habitat for yellow lady's slipper also occurs along Tin Cup Creek and drainages flowing into Tin Cup at elevations below 6000 feet, although this species has never been found on the Bitterroot National Forest. Alpine species that have the potential to occur in the Tin Cup Dam project area include Idaho douglasia, discoid goldenweed, Bitterroot bladderpod and old man's beard. None of the above listed species were found in the Tin Cup Lake Dam project area during surveys, although potentially suitable habitat does exist for giant helleborine, western boneset and California false hellebore at the dam or along the edge of the dam. Bitterroot bladderpod and old man's beard are found above timberline on St. Mary's and St. Joseph Peaks. Bitterroot bladderpod, a local endemic, has also been found near Bass Lake Dam but appears to be associated with the reddish colored rock in the Bitterroot Mountains north of Big Creek. There is a very low probability it would occur in the Tin Cup vicinity and was not found adjacent to the dam during previous surveys. Idaho douglasia has only been found in the Selway-Bitterroot Wilderness on the Nez Perce National Forest. Discoid goldenweed is suspected to occur in alpine areas of the Bitterroot National Forest but has never been found.

A population of Columbia lewisia (*Lewisia columbiana*), a species of interest on the Forest, occurs along the Tin Cup Trail. Columbia lewisia is in the same genus as the bitterroot (*Lewisia rediviva*) and the Tin Cup location is the only known population occurring in the state of Montana. The population occurs on a moist, rocky outcrop about four miles up the Tin Cup Trail, a few feet off the trail.

Regulatory Consistency

The Endangered Species Act requires that the Forest Service conserve endangered and threatened species. The National Forest Management Act and Forest Service policy direct that National Forests be managed to maintain populations of all existing native plant and animal species at or above minimum population levels. A minimum viable population consists of the number of individuals adequately distributed throughout their range necessary to perpetuate the existence of the species in natural, genetically stable, self-sustaining populations. Plant species for which population viability is a concern are identified by the Forest Service as sensitive species. This category may include federal candidates (plants being studied by the U.S. Fish and Wildlife Service for proposed listing as threatened or endangered status), or plant species proposed for listing as threatened or endangered in the Federal Register (MNHP 2005). Forest Service policy requires that activities conducted on National Forest lands be reviewed for possible impacts on endangered, threatened or sensitive species (FSM 2670).

Three federally listed threatened plant species occur in Montana: water howellia (*Howellia aquatilis*), Spalding's catchfly (*Silene spaldingii*), and Ute ladies' tresses (*Spiranthes diluvialis*). None of these species have been found on the Bitterroot National Forest. The Northern Region Sensitive Plant Species List (USDA Forest Service 2004) identifies a number of plants for each National Forest for which population viability is a concern. This list includes 31 vascular and two non-vascular plant species on the Bitterroot National Forest.

Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

There should be no direct impacts on sensitive plants as a result of the No Action Alternative. However, using the trail to access the dam with stock animals would increase the risk of introducing or spreading noxious weeds along the trail and at the dam, potentially adversely impacting sensitive plant habitat for sandweed, scalepod, western pearl-flower, giant helleborine, yellow lady's slipper and California false hellebore. The required use of weed-seed free feed for stock should help reduce this risk but there is still some potential for transporting weed seed on stock, equipment or clothing. The Tin Cup Trail and Dam are periodically monitored for noxious weeds and have been spot treated with herbicides annually since 1999 (trail) and 2002 (dam) to control known populations. These mitigations should reduce impacts from weed spread on potentially suitable sensitive plant habitat so Alternative 1 would not likely result in a trend toward federal listing or reduced viability for any sensitive plant species. If the annual request for helicopter access were granted than impacts would be the same as for Alternative 3.

Cumulative Effects

The cumulative effects of years of dam maintenance have contributed to disturbance at the site and may have been a factor in the introduction of spotted knapweed at the dam site. Recreational use by backpackers, hikers, and other stock users are also contributing factors to weed spread.

Alternative 2 – New Stream Crossing

Direct, Indirect and Cumulative Effects

Effects from Alternative 2 would be similar to the No Action Alternative although impacts would also occur at the new stream crossing.

Alternative 3 – Proposed Action

Direct and Indirect Effects

The Proposed Action would use one to two helicopter trips in the early spring to access the dam. This would not directly impact any sensitive plant species since none are present but may impact potentially suitable habitat for giant helleborine, California false hellebore and western boneset by transporting weed seed onto the dam site. It will be necessary to follow strict guidelines for keeping weeds out of the Selway-Bitterroot Wilderness by using helispots (particularly outside the Wilderness) that are weed free, and keeping the helicopter, cargo baskets and equipment transported into the Wilderness clean of weed-seed.

Cumulative Effects

There is no way of knowing the historical distribution of plant species in the area since the dam was originally constructed in the early 1900s. Since no sensitive plant species were found in the area during our surveys the likelihood of the existence of any of these species historically is probably low. Most likely the amount of disturbance involved in initial dam construction was not sufficient to impact the viability of any plant species. The main impact of recreational and permittee use of the site has been the introduction of spotted knapweed (see Noxious Weed report for more information).

Alternative 4 – Bridge**Direct, Indirect and Cumulative Effects**

The construction of a bridge at the first stream crossing would not impact any sensitive plant species since none are present at this site. There is a species of interest, *Columbia lewisia*, found on the north side of this crossing where the trail climbs out of the river bottom. The small population of plants is growing on a moss and lichen covered rock outcrop. Bridge construction would most likely not disturb the rock outcrop or population of *Columbia lewisia*. The ground disturbance and access to site required to build the bridge would increase the potential for the spread or introduction of noxious weeds, which may adversely impact potentially suitable habitat for sensitive plant species like yellow lady's slipper, giant helleborine, California false hellebore, western pearl-flower, sandweed and scalepod. However, the construction of the bridge will not likely result in a trend toward federal listing or reduced viability for any sensitive plant species.

Alternative 5 – Closing Headgate in Fall**Direct, Indirect and Cumulative Effects**

Closing the headgate in the fall would have similar impacts on sensitive plant species and their habitat as Alternative 1.

Summary of Effects to Sensitive Plant Species

None of the alternatives proposed for accessing Tin Cup Lake would adversely impact any Bitterroot Forest Sensitive Plant species since none are known to occur in the vicinity of the dam or along the trail accessing the dam. There may be some adverse impacts on potentially suitable sensitive plant habitat due to the spread or introduction of noxious weeds. However, these impacts will not likely result in a trend toward federal listing or reduced viability for any sensitive plant species. (See PF K-6 for Sensitive Plant Species Biological Evaluation).

Noxious Weeds

Affected Environment

Introduction

Invasive species (which includes non-native plants, insects and pathogens) have been identified by the Chief of the Forest Service as one of the four biggest threats to the health of National Forests and Grasslands (USDA Forest Service 2003c). As a result of this acknowledged threat the Forest Service has developed a *National Strategy and Implementation Plan for Invasive Species* (USDA Forest Service 2004). Short-term actions identified in this document include: prevention; early detection and rapid response; control and management; and rehabilitation and restoration.

Existing Condition

Spotted knapweed (*Centaurea biebersteinii*) was found at the Tin Cup Lake Dam site and has been treated annually since 2002. Since the population isn't large it will be monitored annually and treated as necessary until it is controlled. Oxeye daisy (*Leucanthemum vulgare*) occurs along the trail at the confluence with the Kerlee Lake drainage. Isolated plants have also been found along the trail to the west of this.

Regulatory Consistency

Bitterroot National Forest Plan, 1987: page II-3 (9) Control noxious weeds to protect resource values and minimize adverse effects on adjacent private land. Mitigation measures for noxious weed prevention are intended to minimize adverse effects.

Federal Noxious Weed Control Act (PL-93-629): The Act provides for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health. Mitigation measures for noxious weed prevention comply with the intent of this Act.

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Using the trail to access the dam with stock animals would increase the risk of introducing or spreading noxious weeds, particularly spotted knapweed and oxeye daisy, along the trail and at the dam. The required use of weed-free feed for stock should help reduce this risk but there is still some potential for transporting weed seed on stock, equipment or clothing. It is recommended that stock users also feed their animals weed-free feed for several days prior to entering National Forest lands (as outlined in Forest Service Manual 2000, Zero Code 2080 – Noxious Weed Management; Supplement R1 2000-2-1-1). The Tin Cup Trail and Dam are periodically monitored for noxious weeds and have been spot treated with herbicides annually since 1999 (trail) and 2002 (dam) to control known populations. These mitigations should reduce the potential for weeds to spread or become permanently established since existing populations are small.

Cumulative Effects

The cumulative effects of years of dam maintenance have contributed to disturbance at the site and may have been a factor in the introduction of spotted knapweed at the dam site. Spotted knapweed and oxeye daisy are also present along the trail leading up to the dam. Recreational use by backpackers, hikers, and other stock users are definitely contributing factors to weed spread. In addition, wildlife may transport weed seed to new areas. The Tin Cup Trail and Dam are periodically monitored for noxious weeds and have been spot treated with herbicides annually since 1999 (trail) and 2002 (dam) to control known populations. Using weed prevention measures (outlined in Mitigation Measures – Chapter 2) for accessing and working at the dam site should reduce the risk of introducing or spreading noxious weeds.

Alternative 2 – New Stream Crossing**Direct, Indirect and Cumulative Effects**

Effects from Alternative 2 would be similar to the No Action Alternative although impacts would also occur at the new stream crossing.

Alternative 3 – Proposed Action**Direct and Indirect Effects**

The Proposed Action has the potential to spread noxious weeds into the dam site via helicopter or on equipment and supplies transported via helicopter. The Forest Service Manual has requirements and recommendations for preventing the risk of noxious weed spread (FSM 2080). Helicopters should use weed-free helibases prior to flying into the wilderness. All cargo netting, equipment and supplies should be inspected and cleaned of weed seed prior to being transported into the wilderness. People working on the dam should inspect their clothing and remove and dispose of any weed seed prior to entering the wilderness.

Cumulative Effects

Cumulative effects of Alternative 3 are similar to those for Alternatives 1 and 2, however the use of a helicopter rather than stock for access would reduce the risks of spreading weeds along the trail. The risks associated with weed spread at the dam would not change and there may be a greater risk of introducing new invaders by utilizing helicopters that have been used in different parts of the state or country.

Alternative 4 – Bridge**Direct, Indirect and Cumulative Effects**

The effects on the spread of noxious weeds by constructing a bridge at the first creek crossing would be similar to Alternatives 1, 2 and 3. The bridge construction would be completed by use of a helicopter, but there would most likely be some stock support involved so there would be impacts at the stream crossing itself as well as along the trail during construction. Impacts along the trail leading up to the dam would continue

annually when accessing the dam to close the headgate. These latter impacts would be the same as in Alternative 1 and 2. Impacts from helicopter use would be the same as for Alternative 3 except effects would be concentrated at the stream crossing rather than at the dam.

Alternative 5 – Closing Headgate in Fall

Direct, Indirect and Cumulative Effects

Closing the headgate in the fall would have similar impacts on noxious weed spread as Alternatives 1 and 2, although the spread of spotted knapweed seed might be slightly increased since spotted knapweed flowers and goes to seed in late summer/early fall. This might increase the likelihood of transporting viable seed along the trail and to the dam site.

Heritage Resources

Affected Environment

Tin Cup dam was determined Not Eligible for the National Register of Historic Places on December 6, 1996. Tin Cup Trail #96 (24RA0492) accesses the lake from Forest Service Road 639. Local historical accounts and the presence of prehistoric sites elsewhere in the watershed indicate that the trail considerably predates 1911, when it first appeared on Forest Service maps. The Trail was determined Eligible for the National Register on August 2, 1995.

Two cultural resource inventories have been conducted at Tin Cup lake and along Tin Cup Trail #96 since 1993: Tin Cup Dam Reconstruction (93-BR-2-10, Eiland), and Tin Cup Trail Reconstruction (94-BR-2-1). During these inventories, the dam, Trail #96 and two other sites were recorded. Tin Cup Trail is the only Eligible site potentially affected by the proposed access alternatives. (See PF K-01).

Regulatory Consistency

The primary legislation governing modern heritage resource management is the National Historic Preservation Act of 1966 (NHPA) (amended 1976, 1980 and 1992). All other heritage resource management laws support, clarify, or expand on NHPA. Specific Forest Service heritage resource management practices are based on Federal Regulations 36CFR800 (Protection of Historic Properties), 36CFR63 (Determination of Eligibility to the National Register of Historic Places), 36CFR296 (Protection of Archaeological Resources), and Forest Service Manual 2360 (FSM2360).

Other laws addressing various aspects of heritage resource management on the National Forests include the National Environmental Policy Act of 1969 (NEPA), the National Forest Management Act of 1976 (NFMA), the Antiquities Act of 1906, the Historic Sites Act of 1935, and the Archaeological Resource Protection Act of 1979 (ARPA) (amended 1988). Along with ARPA, two other regulatory acts, the Native American Graves Protection and Repatriation Act (NAGPRA) and the American Indian Religious Freedom

Act of 1978 (AIRFA), define the role of Tribes in federal heritage resource management. The National Historic Preservation Act also specifically requires Tribal participation in the consultation process.

The Bitterroot Forest Plan tiers to these laws and regulations, as do Forest-wide Management Standards calling for the preservation of significant Heritage resources in place wherever possible, cultural resource inventory for most ground-disturbing activities, and consultation with tribal religious leaders on spiritual sites.

The Confederated Salish and Kootenai Tribes of the Flathead Reservation regard the entire Bitterroot National Forest as an area of cultural concern. The tribes exercise treaty rights on the Forest under the 1855 Hellgate Treaty, and are consulted on all Forest undertakings.

Direct, Indirect and Cumulative Effects

Alternative 1 – No Action: This alternative has no potential to affect known Heritage Resources, provided helicopter landing sites are confined to areas previously surveyed.

Alternative 2 – New Stream Crossing: Re-routing of the trail and construction of a new stream crossing will require cultural resource inventory for unsurveyed portions of the affected locations.

Alternative 3 – Proposed Action: This alternative has no potential to affect known Heritage Resources.

Alternative 4 – Bridge: Construction of a new bridge at the first crossing would require cultural resource inventory for unsurveyed portions of the affected location.

Alternative 5 – Fall Closing of the Headgate: This alternative has no potential to affect known Heritage resources.

Air Quality

Air quality regulations allow omission of certain pollution sources in air quality analyses if they are considered very minor and are certain to have no detrimental effects. These sources are considered to emit pollutant amounts below de minimus levels. Air pollution sources that pass the de minimus test do not need to be included in air pollution impact analyses. (Peterson). The level of aircraft activity and emission associated with the helicopter trips is considered to be below de minimus levels and no further analysis is needed.

Recommendation: There would be no effects to air quality within the Class I area (Selway-Bitterroot Wilderness) as a result of this project.

INTERDISCIPLINARY TEAM MEMBERS

Chuck Oliver – Darby District Ranger
Terri Anderson – Engineering
Deb Gale – Wilderness/Recreation
Linda Pietarinen – Botanist
Dave Lockman – Wildlife
Rob Brassfield – Fisheries
Ed Snook – Hydrology
Mary Williams – Heritage Resource
Nick Hazelbaker – Trails
Roylene Gaul – Lands and Special Uses
Betsy Ballard – Acting North Zone Team Leader

FEDERAL, STATE, AND LOCAL AGENCIES:

Montana State Historic Preservation Officer (2005 Compliance Report)
The Confederated Salish and Kootenai Tribes of the Flathead Reservation (May 2004)
Native American Tribal members were consulted as required by the National Historic Preservation Act, the National Environmental Policy Act, and the American Indian Religious Freedom Act.

OTHERS:

Steve Romero, Region 1 Geotechnical and Dams Safety Engineer
Laurence Siroky, State of Montana Dam Safety Program, Engineer
Mack Long, Montana Fish Wildlife and Parks

Appendix A

Authority to Regulate Safety of Dams on National Forest System Lands

The authorities through which the U.S. Forest Service regulates safety of dams on National Forest lands are as follows:

National Dam Safety and Security Act of 2002 (P.L. 107-310)
National Dam Safety Program Act of 1996 (P.L. 104-303, Section 215)
FSM 7500 Forest Service Engineering Requirements for Water Storage and Transmission Projects, August 1993
FSH 7509.11 Forest Service Dams Management Handbook, August 1993
Water Resources Development Act of 1992 (33 U.S.C. 2201)
Presidential Memorandum of October 1979 and Federal Guidelines for Dam Safety, pub. June 1979, reprinted by FEMA April 2004.
Federal Dam Inspection Act of 1972 (P.L. 92-367)
Departmental Regulations 1043-18 (USDA)
Title 36, Code of Federal Regulations, Part 251 and FSM 2700
Title 18, Code of Federal Regulations, Part 4
Title 33, Code of Federal Regulations, Part 208

Memorandum of Understanding between the State of Montana, Department of Natural Resources and Conservation, and USDA Forest Service, Northern Region, Mar. 2000

Technical requirements, guidelines, and engineering standards related to these subject areas affecting dam safety have been published by the US Bureau of Reclamation, US Corps of Engineers, US Natural Resources and Conservation Service, Federal Emergency Management Agency (FEMA), National Dam Safety Review Board, Interagency Committee on Dam Safety (ICODS), Association of State Dam Safety Officials (ASDSO), etc. (PF G-09).

Responsibility for Dam Safety

Tin Cup Creek Irrigation District, through their engineering representative, is responsible for the design, plans and specifications for this project. The Forest Service is responsible for ensuring compliance with current dam safety laws and regulations on National Forest System Lands. Both parties have the responsibility to protect public safety and the environment from an unacceptable risk of catastrophic failure.

After Teton Dam failed in 1976, the direction for dam safety programs changed through an executive order, signed by President Carter that directed Federal agencies to implement the Federal Guidelines for Dam safety (reprinted April 2004), FEMA Publication No. 93, prepared by the Interagency Committee on Dam Safety (ICODS). (PF G-01) The objective is clearly stated under section I.A. Background: "It is the intent of these guidelines to outline management practices that will help to ensure the use of the

best current technology in the design, construction and operation of new dams and in the safety evaluation of existing dams." In Section II. Objectives and Scope: "Those charged with administering these guidelines must recognize that the achievement of dam safety is through a continuous, dynamic process in which guidelines, practices, and procedures are examined periodically and updated. Technical procedures need to change with technological advancement, and management should ensure that observed deficient practices are corrected and that successful practices are duplicated."

Minimum Requirements Worksheet – Tin Cup Lake Access 2006 - Appendix B

Introduction

Representatives from Tin Cup County Water and/or Sewer District (TCCWSD) typically access Tin Cup Dam early in the spring to perform routine operation and maintenance, which is consistent with their responsibilities under dam safety laws and regulations. During the last several years, TCCWSD changed their operational procedures to decrease the amount of time water is retained behind the dam, and the control gate (headgate) for the outlet pipe is currently left open through the late fall and winter months. This reduced storage time decreases the degree of saturation of the embankment, increasing its reliability. Also, because the dam is fine-grained and lacks adequate erosion protection, reducing the time of storage significantly reduces erosion on the dam face. In addition, freeze/thaw effects are significantly reduced, not only on the embankment and riprap protection, but also on the control gate and outlet works.

Personnel from TCCWSD have notified the Forest Service that accessing the dam in early spring to close the headgate exposes TCCWSD personnel to unnecessary risk, which include high creek flows and avalanche hazards along Tin Cup Trail #96. For the last five consecutive years TCCWSD has requested helicopter access during early spring when these hazards typically occur. Access to the dam would continue to be by stock or on foot later in the summer and fall when these hazards do not normally occur.

The flights would be authorized specifically for the purpose of operation and maintenance activities at Tin Cup Dam, which includes closing the headgate and removing debris near the intake structure for the outlet pipe. During the spring snowmelt when the reservoir level begins to rise, water flowing towards the outlet pipe carries log debris into the outlet structure and control gate. A rock ring barrier has been stacked around the intake structure to prevent this debris from entering into the outlet pipe. However, once the reservoir overtops the rock ring enclosure, small debris floats into the rock ring area and partially plugs the outlet structure, which affects the ability to operate the control gate. In the past, large logs have floated into this area and have been hung up in the cables that support the large trashrack structure, which also supports the gate stem to the control gate. The combination of large logs and wave action could potentially threaten the gate stem which, if bent, would prevent the operation of the control gate. Therefore, TCCWSD personnel would like to close the headgate before runoff flows draw debris into the intake structure. This timeframe typically occurs within the month of April, depending on precipitation and snowmelt conditions.

Forest Service Manual WO Amendment 2300-90-1, 2326.1 – Conditions Under Which Use May Be Approved. Allow the use of motorized equipment or mechanical transport only for:

- Emergencies where the situation involves an inescapable urgency and temporary need for speed beyond that available by primitive means. Categories include fire suppression, health and safety, law enforcement involving serious crime or fugitive pursuit, removal of deceased persons, and aircraft accident investigations.
- Aircraft or motor boat use established before the area was designated as wilderness by the Act of 1964 or subsequent wilderness legislation.
- Exploration and development of valid existing mineral rights (FSM 2323.7).
- Access to surrounded State and private lands and valid occupancies (FSM 2326.13).
- To meet minimum needs for protection and administration of the area as wilderness, only as follows:

- a. A delivery or application problem necessary to meet wilderness objectives cannot be resolved within reason through the use of non-motorized methods.
- b. An essential activity is impossible to accomplish by non-motorized means because of such factors as time or season limitations, safety, or other material restrictions.
- c. A necessary and continuing program was established around the use of motorized equipment before the unit became a part of the National Wilderness Preservation System, and the continued use of motorized equipment is essential to continuation of the program.
- d. Removal or aircraft wreckage when non-motorized methods are unsuitable.

36 CFR 293.13 provides specific direction for access to valid occupancies as follows: Persons with valid occupancies wholly within National Forest Wilderness shall be permitted access to such surrounded occupancies by means consistent with the preservation of National Forest Wilderness which have been or are being customarily used with respect to other such occupancies surrounded by National Forest Wilderness. The Forest Service will, when appropriate, issue permits which shall prescribe the routes of travel to and from the surrounded occupancies, the mode of travel, and other conditions reasonably necessary to preserve the National Forest Wilderness, [39 FR 31321, Aug. 28, 1974]

Issues that affect the wilderness character, visitors and TCCWSD personnel include federal dam safety requirements, public safety and the level of impact created by access (trail vs. helicopter).

The following Minimum Requirements Worksheets are used to document the process to determine the minimum action necessary and reasonable to complete the project (access to Tin Cup Lake Dam for proposed work).

Public comment on the proposed use of mechanical transport will be incorporated into the final decision.

Minimum Requirements Worksheets

STEP 1 – DETERMINING THE MINIMUM REQUIREMENTS FOR MECHANIZED TRANSPORT TO TIN CUP DAM

(A two-part process)

PART A – Minimum Requirement Key to making a determination on wilderness proposals

(Answering these questions will help determine the minimum required action in wilderness.)

Guiding Questions		Use the available space for additional notes as necessary		
Is this an emergency (i.e., a situation that involves an inescapable urgency and temporary need for speed beyond that available by primitive means, such as fire suppression, health and safety of people, law enforcement efforts involving serious crime or fugitive pursuit, retrieval of the deceased or an immediate aircraft accident investigation)?		Answer:	YES:	NO: X
If Yes, then:		Explain: The request for mechanized access to Tin Cup Dam is not due to an emergency situation. Mechanized access is being requested to avoid exposure from unnecessary risks along Tin Cup Creek Trail. Accessing the dam on foot or stock during early spring exposes TCCWSD personnel to a hazardous crossing of Tin Cup Creek during high flows and potential avalanche hazards in areas of high potential for avalanche occurrence. The purpose of the trip is to close the head-gate at the dam and provide for irrigation storage, in addition to completing routine maintenance, which is the dam owner's responsibility under federal dam safety laws.		
If No, then:				
Document rationale for line officer approval using the minimum tool form and proceed with action	↓ Go to next question			
Does the project or activity conflict with the stated wilderness goals, objectives and desired future conditions of applicable legislation, policy and management plans?		Answer:	YES:	NO: X
If Yes, then:		The Wilderness Act, Forest Service Manual Direction (2320), the Bitterroot NF Forest Plan, the Selway-Bitterroot Wilderness General Management Direction, and Dam Safety Laws and Regulations list applicable legislation and policy. FSM 2326.1 lists conditions under which the use of motorized equipment or mechanical transport may be approved. This analysis indicates that one of the conditions is met; An essential activity is impossible to accomplish by non-motorized means because of such factors as time or season limitations, safety, or other material restrictions. Tin Cup Dam is a valid occupancy currently authorized under a Special Use Permit.		
If No, then:				
Do not proceed with the proposed project or activity.	↓ Go to next question			

Are there other less intrusive actions that should be tried first (i.e. signing, visitor education or information)?		Answer:	YES:	NO: X
If Yes, then:	If No, then:	Explain: The action is transport of personnel and supplies to the dam. Other less intrusive actions would not provide safe and reasonable access because of the high creek flows and potential for avalanche activity along the trail during the requested timeframe.		
Implement other actions using the appropriate process.	↓ Go to next question			
Can this project or activity be accomplished outside of wilderness and still achieve its objectives (i.e. some group events)?		Answer:	YES:	NO: X
If Yes, then:	If No, then:	Explain: Tin Cup Dam is located in the Selway-Bitterroot Wilderness.		
Proceed with action outside of wilderness using the appropriate process.	↓ Go to next question			
Is this project or activity subject to valid existing rights (i.e. a mining claim or right-of-way easement)?		Answer:	YES: X	NO:
If Yes, then:	If No, then:	Explain: See explanation on the introduction page as well as below.		
Proceed to minimum tool section of this document, STEP 2.	↓ Go to next question			
Is there a special provision in legislation (the 1964 Wilderness Act or subsequent wilderness legislation) that allows this project or activity (i.e. maintenance of dams or water storage facilities with motorized equipment and mechanical transport or control of fire, insects and disease)?		Answer:	YES: X	NO:
If Yes, then:	If No, then:	Explain: The Wilderness Act does not specifically address mechanized access to wilderness dams. In Section 4c it addresses access to all areas in Wilderness "[S]ubject to existing private rights...there shall be no use of motor vehicles [or] motorized equipment...in any such area." Section 5(b) states "In any case where... other valid occupancies are wholly within a designated forest wilderness area, the Secretary of Agriculture shall, by reasonable regulations consistent with the preservation of the area as wilderness, permit ingress and egress to such surrounding areas by means which have been or are being customarily enjoyed with respect to such areas similarly situated." Requests for access with mechanical transport are evaluated on a case-by-case basis, using Forest Service Manual direction and a Minimum Requirements Analysis.		
The proposed project or activity can be <u>considered</u> but it is not necessarily <u>required</u> just because it is mentioned in legislation. Go to Part B, as needed.	↓ Proceed to Part B, Responsive Questions			

Minimum Requirements Worksheets

PART B – Determining the Minimum Requirement

EFFECTS ON WILDERNESS CHARACTER	RESPONSIVE STATEMENT	
How does the project or activity benefit the wilderness resource as a whole as opposed to maximizing one resource?	NA – Tin Cup County and/or Sewer District has the right to access Tin Cup Dam for the reasonable use and enjoyment of these facilities. All project activities would occur within the area authorized under the terms and conditions of their special use permit.	
If this project or activity were not completed, what would be the beneficial and detrimental effects to the wilderness resource?	See above	
How would the project or activity help ensure that human presence is kept to a minimum and that the area is affected primarily by the forces of nature instead of being manipulated by humans?	See following worksheets addressing each alternative. In mid-April use on Tin Cup Trail #96 is typically low. Because Tin Cup creek flows are high, and the first creek crossing of Tin Cup Creek is hazardous, there is less likelihood of hikers on the trail this early in the season. In addition, there are two more fords to cross, as well as avalanche chutes between miles 8 and 10 that typically hold snow until early summer. Due to these conditions the possibility of having hikers camped at the lake would be low. Analysis indicates that mechanized round-trip transport would take approximately ½ day with a total length of project time approximately ½ day to one day. See following worksheets addressing each alternative.	
How would the project or activity ensure that the wilderness provides outstanding opportunities for solitude or a primitive and unconfined type of recreation (i.e. does the project or activity contribute to people's sense that they are in a remote place with opportunities for self-discovery, adventure, quietness, connection with nature, freedom, etc.)?	See above. Because the use along Tin Cup Trail #96 and at Tin Cup Lake in mid-April is low, the probability of interfering with the visitor's opportunity for solitude is minimal. The primary effects on visitor experience will be at Tin Cup Dam. Due to the additional fords and avalanche chutes that tend to hold snow until early summer, the possibility of disturbing campers at the lake would also be low.	
MANAGEMENT SITUATION		
What do your management plan, policy and legislation say to support proceeding with this project?	See Step 1 - Part A.	
How did you consider wilderness values over convenience, comfort, political, economic or commercial values while evaluating this project or activity?	See following worksheets addressing each alternative.	
SHOULD WE PROCEED?	YES: X <i>Go to STEP 2</i>	NO: <i>Stop</i>

Minimum Requirements Worksheets

STEP 2 – DETERMINING THE MINIMUM TOOL

(The Minimum Tool Analysis)

Describe the alternatives. Be specific and provide detail.

Alternative 1 - No Action: This alternative would require TCCWSD to continue walking and/or riding in using the existing ford or requesting helicopter access on an annual basis to close the control gate at Tin Cup Dam. These helicopter requests have been on-going for the last consecutive five years and the requests correspond to an operational change that was made at Tin Cup Dam in an effort to improve dam safety.

Alternative 2 - New Stream Crossing: This alternative would consist of re-routing the trail and constructing a new stream crossing. Based on preliminary surveys, 1000 lf of tread construction and construction of a new ford with downstream structure (log or rock) would be necessary. Immediate approaches to either side must be hardened using geotextile materials and fill. Numerous portions of the new access trail will require fill to maintain tread, piping in fills, ditching, as well as tree clearing. Estimated cost to the government would be \$40,000 to \$50,000 for 1/5 mile of trail.

Alternative 3 - Proposed Action: This alternative would authorize one to two helicopter trips per year in early spring (early-April to mid-May). This timeframe is typically during the time of year when snow conditions are susceptible to avalanche occurrences at several locations along the trail accessing Tin Cup Dam. The first stream crossing has also presented a hazard to stock in the past during this timeframe. All helicopter costs associated with this alternative would be the responsibility of TCCWSD.

Alternative 4 - Bridge: This alternative would authorize the construction of a new bridge at the first crossing. Because of the public use on National Forest System Lands, the bridge would be constructed to required engineering standards. Several bridge locations were considered, and the minimum span length required is approximately 60 feet. (The limit on a packable bridge span is 36 feet). At least four stringers would be required for a stock bridge with either curbing or rails. Stringers would have to be flown in. Estimated cost to the government is \$90,000 to \$125,000, which includes approximately 500 lineal feet of new trail construction to access it from both sides of Tin Cup Creek.

Alternative 5 – Closing the headgate in the fall: This alternative consists of closing the headgate in the fall when the trail is typically clear of snow and the water in the creek crossing is low. Therefore, no special access provisions would be authorized under this special use permit.

Alternative Not Looked at in depth: Alternative 6 – Construct an 8-foot wide road from Tin Cup Trailhead to Tin Cup Dam. Motorized use of the road would be limited to TCCWSD use only.

Economic, Logistical and Timing Considerations

Notes:

- Logistical and timing considerations are fundamental factors in the decision to authorize mechanized transport. The high creek flows at the first crossing present a hazard to both stock and riders during the time access is needed. The snow pack at higher elevations near the dam presents difficult access in addition to potential avalanche hazards. The trail crosses several avalanche chutes within the last few miles near Tin Cup Dam. The timeframe to access the dam is critical because the headgate needs to be closed before the snowmelt and spring runoff raises the reservoir level above the rock ring barrier, which draws woody debris into the intake structure and control gate, which could interfere the ability to operate the gate. In addition, the combination of large logs and wave action could bend the gate stem, which would also prevent the operation of the headgate.

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Estimated Project Costs	None	\$40 – 50,000 (Government)	\$1200-\$1500 (TCCWSD)	\$90 - 125,000 (Government)	None
Estimated days for mechanized access	None	None	½ - 1 day	2 -3	None
Estimated time for project completion	2 - 3 days	40-50 days	½ - 1 day	20 days	2 - 3 days

*Opportunity Class – A hypothetical set of conditions that will be maintained or restored within wilderness. More than one opportunity class description is developed in order to reflect the varying levels of human-caused change, solitude, challenge, and management activities experience within the wilderness.

Biophysical Effects

Common to All Alternatives: The Tin Cup drainage is in Opportunity Class 4* and receives relatively high use during the summer season but low use in April. Opportunity Class 4 is characterized by a predominantly unmodified natural environment. Natural conditions in many locations may be substantially affected by the action of users. Environmental impacts are relatively high in areas along major travel routes, and lakeshores. Visitors can expect to see some human impacts that persist from year to year. The area around Tin Cup Lake exceeds Forest Plan standards by the number of campsites that are too heavily impacted. Tin Cup Trail #96 is a popular stock and foot trail.

Alternative 1: This alternative would have no effect on wilderness and trails in the short term. However, in the long term, if the dam is not operated and maintained in accordance with federal dam safety laws and regulations, there is the possibility of developing problems associated with the outlet works. If the headgate cannot function properly, emergency situations may not be mitigated in a timely manner. If this were to happen then the Wilderness and trails resource would be affected resulting in severe soil movement, drainage scouring and vegetation damage. This soil movement has the potential for effects to natural integrity (changing stream channels and opening areas to noxious weeds), apparent naturalness (as a result of trail or watershed repairs) and special features. Effects to wildlife habitat and populations would be negligible. Effects to fish habitat and populations would be negligible, unless emergency situations occur. Emergency situations, such as dam failure, were considered unlikely in the aquatic resources section of the EA because it was assumed that remedies would occur prior to rapid and large scale deterioration of the dam.

Alternative 2: The new ford location would be subject to high water periods and be potentially unusable at times, like the existing ford. A second ford and the access trail to each approach would be intrusive to the area it crosses. The planned location of this second ford is not advisable as it places the trail below past high water levels so portions could be subject to flooding during high water events. It utilizes poorly drained soils which will require multiple, expensive fills with drainage structures as it crosses voids, organic hummocks, and high water channels. Rerouting the trail would cause very minor reductions in the amount of habitat for several wildlife species and fish species. It is unlikely that these minor changes would have any effect on abundance or viability of these species.

Alternative 3: Effects on fisheries, vegetation, sensitive plants and cultural resources would be low with air transport (unless a helicopter crashes – which has fuel spill and aircraft removal problems). Upstream of the Kerlee Lake tributary there is a steep section of stream. This geologic feature creates a barrier to upstream fish movement and this is the upper distribution of bull trout in Tin Cup Creek. Bull trout, federally listed as threatened, sparsely populate approximately 10 miles of stream downstream of this point. Bull trout are rare between the National Forest boundary and Selway-Bitterroot Wilderness boundary, and more abundant, but still uncommon between the wilderness boundary and the barrier falls. Westslope cutthroat trout, a sensitive species, are present in Tin Cup Creek from the Bitterroot River confluence to the headwaters upstream of Tin Cup Reservoir. Implementation of the proposal is expected to have no effect on bull or cutthroat trout. Helicopter flights in the spring could disturb the peregrine falcon eyrie in the south-facing cliffs near the mouth of the canyon. Peregrines are sensitive to disturbance early in the nesting season, but have successfully fledged young from this eyrie in previous years when several spring helicopter flights occurred. Helicopter flights could also disturb mountain goats wintering on south-facing cliffs. The risk of effects to both species and the severity of any effects could be minimized by restricting the helicopter flight path to the south side of the canyon or by flying up an adjacent canyon.

Alternative 4: Rerouting the trail and constructing bridge footings would cause very minor reductions in the amount of habitat for fish and several wildlife species. It is unlikely that these minor changes would have any effect on abundance or viability of these species. By constructing a bridge and potentially changing use patterns the condition of Trail #96 above the bridge could change with increased spring use. Effects to a trail tread used in wet conditions could be damaging especially if used by pack and saddle stock. Specific damages could include: tread surface damage when soft and/or saturated; drainage structures filled with mud and ineffective tread widening at low, poorly drained sites; and a larger number of “go around” routes at downed trees. Increased water running in trail tread from early season use, coupled with the loosened soil from stock use could increase erosion where it didn’t occur without spring use.

Alternative 5: See Alternative 1 – no action. Effects to fish and wildlife habitat and populations would be negligible.

Common to All Alternatives: The Tin Cup drainage is in Opportunity Class 4* and receives relatively high use during the summer season but low use in April. Opportunity Class 4 allows for some sign of human modification and more human interaction than would be expected in pristine areas. Visitors can expect to see some human impacts that persist from year to year, to encounter other users on the trail and at campsites, and to have a reduced opportunity to experience solitude or remoteness. The area around Tin Cup Lake exceeds Forest Plan standards by the number of campsites that are too heavily impacted. Tin Cup Trail #96 is a popular stock and foot trail.

Alternative 1: This alternative would have no effect on the visitor's expectations of naturalness, remoteness and solitude in the short term. However, in the long term, if the dam is not operated and maintained as required by federal dam safety laws and regulations, there is the possibility of developing problems associated with the outlet works. If the headgate cannot function properly, emergency situations may not be mitigated in a timely manner. If this were to happen then the Wilderness and trails resource would be affected resulting in severe soil movement, drainage scouring and vegetation damage. This soil movement has the potential for effects to natural integrity (changing stream channels and opening areas to noxious weeds), apparent naturalness (as a result of trail or watershed repairs) and special features.

Alternative 2: This new ford would have little effect on apparent naturalness, remoteness and solitude. The easier crossing may allow some earlier stock use and change use trends slightly but users would soon be turned back by snow and the additional crossings as they travel up the drainage. Apparent naturalness is indicated by how the environment looks to most people using the area. The addition of a second trail that basically parallels Trail #96 would affect ones interpretation of that naturalness. Remoteness is a perceived condition of being secluded, inaccessible, and out of the way, while solitude is a personal, subjective value defined as an isolation from the sights, sounds, and presence of others and the developments of man. The remote quality of inaccessibility could be affected by this alternative, as the trail accessibility at this creek crossing would be increased in the spring. Solitude could be affected by an increase in encounters in the spring.

Alternative 3: Visitor expectations of naturalness, remoteness and solitude would be impacted by the sight and sound of the helicopter and it landing at the lake. Due to the hazardous first creek crossing of Tin Cup Creek, two additional crossings further up the trail and numerous avalanche chutes that hold snow on the trail until early summer the likelihood of hikers or stock users in the Tin Cup drainage at this time of year would be very low. The physical effects of mechanized transport would total approximately ½ day and the work project would take approximately ½ day to 1 day to complete.

Alternative 4: Construction and presence of a bridge would have an effect on apparent naturalness, remoteness and solitude. The easier crossing may allow some earlier hiker and stock use and change use trends slightly but these folks would soon be turned back by snow and the additional crossings as they traveled up the drainage. Apparent naturalness is indicated by how the environment looks to most people using the area. A bridge would be perceived as not apparently natural, a real imprint of mans presence. Remoteness is a perceived condition of being secluded, inaccessible, and out of the way, while solitude is a personal, subjective value defined as an isolation for the sights, sounds, and presence of others and the developments of man. The remote quality of inaccessibility could be affected by this alternative, as the trail accessibility at this creek crossing would be increased in the spring. Solitude could be affected by an increase in encounters in the spring. A bridge would affect the unconfined nature of the recreation experience by providing safe access at this crossing.

Alternative 5: see Alternative 1 – no action

Societal/Political Effect

Common To All Alternatives: Tin Cup County Water and/or Sewer District is liable for damages associated with a dam failure, particularly if the dam owner is determined to be negligent. Negligence is the lack or failure of actions that a reasonable dam owner would perform in constructing, maintaining, and operating a dam.

Health and Safety Concerns

Common to All Alternatives: If TCCWSD personnel are not able to access the dam and close the headgate before spring snowmelt and runoff, small woody debris will be carried over the top of the rock ring around the outlet works and potentially plug the outlet pipe. Debris can become lodged in the headgate or outlet pipe and prevent the irrigators from operating the outlet gate. It is important for the gate to function normally – to close the slide gate to store water or open in case there is a need to release water and draw the reservoir down. As the dam owner and responsible party, Tin Cup County Water and/or Sewer District is responsible to operate and maintain their dam in a safe condition.

Alternative 1: If TCCWSD personnel attempt to access the dam by stock to close the headgate, there is a hazardous crossing of Tin Cup Creek, located approximately 3 miles up the trail. Attempts have been made to cross Tin Cup Creek during high flows in the past, and there have been a couple of close calls or incidents that have served as a warning to not pursue the crossing during high stream flows. Below the stream crossing is a rocky section of the channel with high flow velocities because of the steep gradient. If the stock trips up, both rider and stock could be thrown against the rocks by high flow velocities in the steep section of the stream. This situation presents a risk of severe injury or even a fatal accident if a blow to the head occurs.

Alternative 2: This alternative improves the access conditions by re-routing the trail away from the hazardous crossing and constructing a new ford in a location where the stream gradient is reduced. However, this alternative does not address potential hazards along the trail in areas of historical avalanche activity. Several active chutes cross the trail, and TCCWSD personnel have notified the Forest Service of these occurrences in the past, including a recent event that deposited logs and debris in the reservoir around the dam. This resulted in an accumulation of woody debris on the upstream embankment, within the spillway flow channel, and around the control gate structure.

Alternative 3: There is some risk of severe injury or death associated with helicopter use. However, the risk of transporting personnel using a reliable helicopter company is most likely to be the safer alternative when compared to crossing hazardous avalanche chutes and a hazardous stream crossing that has presented an unsafe situation for both travel on foot or stock in the past. This alternative provides reasonable access for the specific purpose of operating and maintaining Tin Cup Dam within a reasonable and opportune timeframe.

Alternative 4: This alternative also provides improved access conditions at the first crossing of Tin Cup Creek (similar to Alternative 2). However, this alternative does not address potential hazards along the trail in areas of historical avalanche activity. Several active chutes cross the trail, and TCCWSD personnel have notified the Forest Service of these occurrences in the past, particularly activity that has occurred within recent years that caused logs and debris to accumulate upstream of the dam and block the spillway flow channel.

Alternative 5: This alternative eliminates the potential hazards related to avalanches and creek crossings during high flows because the control gate would be closed in the fall. However, this alternative adversely affects the long term performance of the dam embankment and the health and safety of people and property located downstream in the inundation area of Tin Cup Dam. The adverse affects from closing the gate in the fall include: 1) saturation of the embankment and increased time of exposure to downstream life and property 2) increases the potential risk of dam failure caused by piping and internal erosion of the embankment materials because of the reservoir head and hydraulic gradient driving this failure mechanism, 3) increases the potential for slope failure due to saturation of the embankment toe, typically occurring at high reservoir levels, 4) increases the risk of overtopping the dam because of high inflow or a spillway plugged with debris and ice, 5) increases erosion on the upstream embankment caused by frost heave, wave action and accumulation of debris 6) increases the potential for large logs causing damage to the trashrack and supporting cable system, which could bend the gate stem and affect the ability to open and close the headgate, 7) increases the buildup of ice and freeze/thaw damage to the control gate and trashrack structure, and 8) eliminates the opportunity for TCCWSD personnel to visually inspect and repair any potential hazards affecting embankment stability (sinkholes, slides, cracks, rodent holes, debris in the intake structure, etc.) that have developed through the fall and winter months before closing the headgate and filling the reservoir.

Formulate a preferred action. Be specific and describe in detail below.

Alternative 3 meets 2 of the conditions listed in FSM, WO Amendment 2300-90-1, 2326.1- Conditions Under Which Use May Be Approved. Allow the use of motorized equipment or mechanical transport only for:

- **Emergencies or inescapable urgency and temporary need for speed beyond that available by primitive means.** – As shown in Step 1 part A the request for mechanized access to Tin Cup Dam is not due to an emergency situation.
- **Access to surrounded State and private lands and valid occupancies (FSM 2326.13)**
- **To meet minimum needs for protection and administration of the area as wilderness, only as follows: (b.) An essential activity is impossible to accomplish by non-motorized means because of such factors as time or season limitations, safety, or other material restrictions. The unsafe crossing at Tin Cup Creek during high flows presents an unreasonable access situation. By authorizing one to two helicopter flights, TCCWSD personnel can accomplish their necessary operation and maintenance of their facility in a safe and reasonable manner. Tin Cup County Water and/or Sewer District is responsible for the operation and maintenance of their facility in accordance with current dam safety laws and regulations, including the Federal Guidelines for Dam Safety. The dam owner is legally held to a general standard of care of their dam facility. If problems occur with the safety of the dam facility, the dam owner can be liable for damages, particularly if they are determined to be negligent in their duties, which includes operation and maintenance. By allowing TCCWSD to operate and maintain their dam in a reasonable manner, both public safety and forest resources including ultimately protected.**

Alternative 3 balances the responsibilities of Tin Cup Water and/or Sewer District with impacts to Wilderness. There is likely to be minimal impacts to visitors' wilderness experience because of low visitation and difficult access in early spring. Tin Cup Water and/or Sewer District is obligated to operate and maintain their dam facility, which includes taking reasonable action to prevent dam safety incidents from developing.

The following individuals were involved in preparing and reviewing this minimum requirement worksheet:

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01-10-2006

Appendix C

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Also see Appendix A for dam safety laws.

Appendix D

Additional Considerations – Authorization of Helicopter Flights to Tin Cup Dam in Early Spring, February 2006

This section provides additional considerations for the authorization of two helicopter flights in early spring from early-April to mid-May when there may be hazardous conditions associated with access to the dam from either snow conditions suitable for avalanche occurrences or difficulty in crossing Tin Cup Creek because of high flows. Personnel from Tin Cup Water and/or Sewer District have brought these potential hazards to the attention of Forest Service personnel.

The dam owner is responsible for operating and maintaining their dam in a safe and prudent manner to prevent the dam from deteriorating and potentially threatening property or people that live downstream of the dam. The dam owner is legally held to a general standard of care of the dam facility. The dam owners can be liable for damages if they are negligent in their duties, or fail to make safe or maintain their facility. Negligence can apply to the design, construction, operation or maintenance of the dam.

A good example of negligence related to dam maintenance would be the accumulated debris in the spillway, and the dam owners not cleaning it out in a timely manner, which could result in overtopping the dam which could ultimately result in a dam failure. Although this situation in itself may not constitute an emergency, it is a situation that could develop into an emergency if not acted on in a timely manner. The dam owners are responsible for recognizing this situation as a warning based on the reasonable foreseeability of risk, otherwise they could face the potential charge of negligence in the event of a dam failure.

After completing NEPA documents (decision memos) and minimum requirements analyses on a case by case basis for spring helicopter access to Tin Cup Dam for the last five consecutive years, there is strong rationale in support of authorization of spring helicopter access to Tin Cup Dam on a long-term basis, specifically for the purpose of operation and maintenance activities at Tin Cup Dam. According to TCCWSD, the current process for completing annual decision memos and minimum requirements analyses for this recurring activity does not provide adequate access for the purpose of operating and maintaining Tin Cup Dam. It is important for Forest Service managers to allow the dam owners to maintain their structure according to the reasonable care standard - and without delays for situations with potential to affect the safety of the structure.

A decision memo and minimum requirements analysis typically takes two to three days, so if TCCWSD personnel were to start up the trail on foot or horseback and determine that there were potential hazards up the trail, then turn around and return to civilization to notify Forest Service to start a minimum requirements analysis, and wait for a response - the reservoir level could overtop the rock ring around the outlet works and draw debris into the intake structure. If log debris is drawn into the outlet works area, wave action

combined with large logs could shift the trashrack structure and bend the gate stem and affect the ability to open and close the headgate (see photo below). This situation is not acceptable during emergency conditions requiring quick drawdown of the reservoir. This unnecessary complication can be avoided by authorizing TCCWSD personnel to access their dam by helicopter in early spring as part of their on-going operation and maintenance program, during a timeframe when conditions are typically not suitable for ground access. TCCWSD normally monitors the reservoir level by fixed wing flights to determine the timing to close the headgate.

Authorization of spring helicopter access to Tin Cup Dam is an important factor in implementing an effective dam safety program in accordance with dam safety laws and regulations that have come into effect since the 1964 Wilderness Act. These dam safety laws are very specific and direct federal agencies to implement an effective dam safety program that is in keeping with the intent of today's laws and regulations, as well as technology and acceptable engineering and operation and maintenance practices related to dam safety. These laws include but are not limited to the 1979 Federal Guidelines for Dam Safety, the 1996 National Dam Safety Program Act and the 2002 National Dam Safety and Security Act.



Rock barrier upstream of control gate at Tin Cup Dam (photo taken at low reservoir level)